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STEEL SHIPBUILDER'S HANDBOOK

An encyclopedia of the names of parts, tools, operations, trades, abbreviations, etc., used in the building of steel ships

ESTATE OF E. L. COOL

BY

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INTRODUCTION

This Handbook is designed to help the thousands of workmen in the shipyards all over the United States and Canada to understand the names of the parts, tools, operations, trades, abbreviations, etc., used in the building of steel ships, thus helping in a large measure to speed up the program of the Emergency Fleet Corporation of the U. S. Shipping Board and finally to HELP WIN THE WAR.

A study has been made of the latest and best methods used in the large Shipbuilding Plants all over the country and of the best text-books on steel shipbuilding. Among the books consulted in obtaining accurate definitions were the following: Holms's "Practical Shipbuilding"; Patterson's "Illustrated Nautical Encyclopedia"; Lloyd's "Rules and Regulations"; Simpson's "Naval Constructor"; Attwood's "Naval Architecture"; Peabody's "Naval Architecture"; Walton's "Know Your Own Ship"; "Shipbuilding for Beginners," by the Emergency Fleet Corporation; and "Emergency Training in Shipbuilding," by the Federal Board for Vocational Education.

The definitions have been arranged alphabetically and cross-referenced as completely as possible.

Index numbers put after a word such as, **After Perpendicular** [1] or **Bulkhead** [1, 3, 4], indicates that that part is illustrated on Plate 1, Plate 3, and Plate 4 at the back of the book. These plates were drawn with the object in mind to illustrate all the parts possible

on the drawings and some of the parts are not in their best location for an actual working drawing.

The book is printed in this size and shape and the drawings reduced to this size to make it possible to carry the book in the pocket at all times and whenever a new name or word is encountered on the work it could be looked up without having to unfold a large drawing, also making it possible to study the book on street cars, trains or automobiles without inconvenience.

This book should also be of great assistance to the numerous classes in Shipbuilding conducted in the large cities all over the country, one of the largest of which is being conducted at the University of Southern California by the Author.

About 1600 names are defined and about 300 parts illustrated.

C. W. Cook.

Los Angeles,
July, 1918

STEEL SHIPBUILDER'S HANDBOOK

A

Abaft.—Meaning aft of.

Abbreviations and Symbols Used on Drawings.

Alt.	Alternate.
A.P.	After perpendicular.
L	Angle.
B.L.	Base Line.
Blge.	Bilge.
B.B.FL.Cl.	Bilge Bracket Floor Clip.
B.R.	Boiler Room.
B.S.	Boiler Space.
Brkt.	Bracket.
B.	Breadth.
L or B.A.	Bulb Angle.
Bhd. or Blkd.	Bulkhead.
$	Butt Strap.
Btk.L.	Buttock Line.
Cbr.	Camber.
C.I.	Cast Iron.
C.St.	Cast Steel.
C.B.	Center of Buoyancy.
C.G.	Center of Gravity.
C.B.P.	Center between Perpendiculars.
℄ or C.L.	Center Line.

Abbreviations and Symbols—*Continued*

Ctrs.	Centers.
Ch. or ⌐¬	Channel.
Cl.	Clip.
Coll. Bhd.	Collision Bulkhead (first bulkhead aft of stem).
Ctsk.O.S. or ⊗	Countersink other side.
Ctsk.T.S. or ⋋⋌	Countersink this side.
Ctsk.	Countersunk.
Dk.	Deck.
D.	Depth.
Dia.	Diameter.
Dbl.	Double.
D.R.B.L. or //	Double Riveted Butt Lap.
D.R., D.S.	Double Riveted, Double Strap.
D.R.L. or //	Double Riveted Edge Lap.
D.R., S.S.	Double Riveted Single Strap.
Dblg.Pl.	Doubling Plate.
Elev.	Elevation.
E.C.U.Dk.B.Cl.	Engine Casing Upper Deck Beam Clip.
E.R.	Engine Rooms.
Flg.	Flange.
Fl.	Floor.
Fl.Stfr.	Floor Stiffener.
F. & A.	Fore and Aft.
F.P.	Forward Perpendicular.
Fr.	Frame.
Fbd.	Freeboard.
Galv.	Galvanized.
Gdr.	Girder.
H. Col.	"H" Section Rolled Steel Column or Pillar.

Abbreviations and Symbols—*Continued*

½L.	Half Length.
H.R.	Half Round.
I.	I Beam.
I.B.	In Board.
Jg.Pl.	Joggled Plate.
L.	Length.
L.O.A.	Length Over All.
L.P.P.	Length Perpendicular to Perpendicular.
L.B.P.	Length between Perpendiculars.
L.H.	Lightening Hole.
L.W.L.	Load Water Line.
L.W.P.	Load Water Plane.
M.	Meta Center.
⌀	Midship.
Mld.	Molded.
O.T.Bhd.	Oil Tight Bulkhead.
O.T.Fl.	Oil Tight Floor.
O.T.Mh.	Oil Tight Manhole.
O.C.	On Centers.
O.P.	Oregon Pine
O.B.	Out Board.
P/CK.Riv.	Pan Head Countersunk Rivet.
P.	Pitch.
Pl.	Plate.
Pt.	Port.
# or Lbs.	Pounds.
Q.R.B.L. or ////	Quadruple Riveted Butt Lap.
Q.R.D.B.S. or ////	Quadruple Riveted Double Butt.
Q.R.S.B.S. or ////	Quadruple Riveted Single Butt Strap.

Abbreviations and Symbols—*Continued*

¼R.	Quarter Round.
R., r., or Rad.	Radius.
Rw.	Redwood.
Rev. Fr.	Reverse Frame.
S.D.B.B.	Second Deck Beam Bracket.
Sec.	Section.
S.R.L. or /	Single Riveted Lap.
Spa.	Space.
Stbd.	Starboard.
Stfr.	Stiffener.
Str.	Stringer.
T.	"T" Section (Rolled Steel).
Trans.	Transverse.
T.R.L. or ///	Treble Riveted Butt Lap.
T.R.D.B.S. or ///	Treble Riveted Double Butt Strap.
T.R.L. or ///	Treble Riveted Edge Lap.
T.R.S.B.S. or ///	Treble Riveted Single Butt Strap.
T.S.S.	Twin Screw Steamer.
⅖L.	Two fifths Length.
V.K.FL.Cl.	Vertical Keel Floor Clip.
W.L.	Water Line.
W.L. 1, 2, etc.	Water Line No. 1, No. 2, etc.
W.T.	Water Tight.
W.T.Bhd.	Water Tight Bulkhead.
W.T.Fl.	Water Tight Floor.
W.T.Mh.	Water Tight Manhole.
W.I.P.	Wrought Iron Pipe.
Y.P.	Yellow Pine.
Z.	Z Section (Rolled Steel).

Accommodation Ladder.—A ladder extending from a gangway down along the side nearly to the vessel's water line.

Acid Process.—Either the open hearth or Bessemer Process of making steel where the lining of the furnace is not basic and a pig iron low in phosphorus and sulphur is required. (See **Steel.**)

Aerial.—The wires stretched between two masts to receive and transmit wireless messages.

Aft.—At, near, or toward the stern.

After.—Nearer the stern.

After Peak Bulkhead.—See **Bulkhead.**

After Peak Tank.—See **Trimming Tank.**

After Perpendicular.[1]—A vertical straight line at the after edge of the rudder post.

Air Duct.—A duct running from a lower deck to the weather deck to admit air below.

Air Hammer.—Hammer driven by compressed air for riveting. Sometimes called air gun or "gun."

Air Holding-on Hammer.—Hammer with air cushion for holding against a rivet.

Air Holes. See **Blowholes.**

Air Holes.—Small holes in upper part of floors and longitudinals to allow escape of air when tank is being filled with water.

[1] See Introduction.

Air Pipe. A galvanized iron pipe fitted into tank top and extending to upper deck to allow escape of air and complete filling of ballast tanks.

Air Port.—A circular opening in the ship's side.

Air Trunk.—A valve in a ventilating trunk so arranged that if water should get into it a float would raise and stop the flow of water. (See **Float Valve.**)

Air Washer.—Passing air through a fine spray of water to cool it and remove impurities.

Alignment.—The lining in of a keel or propeller shaft with a surveyor's transit to keep it exactly straight.

American Bureau of Shipping.—An American organization similar to Lloyd's and having the same relation to American shipping as Lloyd's have to English shipping. (See **Lloyd's.**)

Anchor.—A heavy steel device that is attached to the end of a large chain or hawser to be dropped to the bottom for holding the ship in position when not alongside a dock.

Anchor, Bower.—An anchor carried in the bow of boat, sometimes the largest anchor carried.

Anchor Crane. See **Davit.**

Anchor Davit. See **Davit.**

Anchor Flukes.—The lower enlarged points of an anchor.

Anchor, Kedge.—The smallest anchor carried which is used for "kedging" or hauling the ship along in a channel. (See **Kedge.**)

Anchor, Self Stowing.—An anchor whose flukes fold up against the side of the vessel when held in place or stowed.

Anchor Shank.—The vertical central portion of an anchor.

Anchor, Sheet.—The largest and best anchor.

Anchor, Spare.—An extra anchor carried for emergencies.

Anchor Stock.—The horizontal upper portion of an anchor.

Anchor, Stream.—A medium-sized anchor about twice the size of a kedge anchor.

Angle of Repose.—The steepest angle at which a bank of coal (or any other material) will stand without falling.

Angle of Rudder.—The angle the rudder makes with the longitudinal axis of the boat.

Anneal.—To heat and cool metal slowly for the purpose of softening.

Anti-fouling Composition.—A paint or soapy substance having a poisonous content, painted on to the bottom and sides of a ship to prevent fouling.

Ash Shoot.—An inclined shoot running from the stokehold overboard to eject ashes.

Assembling.—Putting the various parts of a ship together.

Athwartships.—Across the ship, at right angles to the keel.

Attachment Angles.—Angles used to fasten one part to another.

Automatic Float Valves. See **Valves.**

Auxiliaries.—Various winches, pumps, motors, and other small engines required on a ship.

Auxiliary Foundations.—Supports for pumps, distillers, condensers, etc.

Awning Deck. See **Deck.**

Awning Deck Ship.—A ship where the upper construction is lighter than a spar deck ship, and where the second deck is the strength deck.

Awning Stanchions.[2]—The vertical support for the rafters supporting the awnings, usually made a part of the pipe railing.

B

Babbit Metal.—An alloy of about 85 per cent tin, 7 per cent copper, 8 per cent antimony, used in bearings.

Back Stay. See **Stay.**

Back Strap.—An extra strap sometimes used in lap joints in riveting.

Baffle Board. Same as **Wash Bulkhead.**

Balanced Rudder. See **Rudder.**

Ballast.—Any weight carried in the hold or tanks of a ship to make it sink far enough into the water to be safe at sea.

Ballast, Draft.—The amount of ballast necessary to give the ship (about one half the load draft) to make it safe.

Ballast Pump. See **Pump.**

Barge.—A cargo vessel with no means of propulsion.

Bar Keel. See **Keel.**

Base Line. See **Lines.**

Basic Process.—Either the open hearth or Bessemer Process of making steel where the lining of the furnace is made of Dolomitic limestone, which forms a basic slag and makes it possible to use a pig iron which is high in phosphorus and sulphur. (See **Steel.**)

Bat Rivet. See **Rivet.**

Batten.—A thin strip of wood used in measuring or making templates. (See also **Cargo Batten.**)

Beam.—An athwartship member supporting a portion of a deck. Also the width of the ship.

Beam Bending Machine.—A powerful machine composed of a yoke and a plunger for straightening or curving beams.

Beam Knee.[2]—The enlarged end of a beam, by which it is attached to a frame making a bracket.

Beam Mold.—A pattern made in the mold loft, giving the shape to which to bend a beam.

Bear.—A hydraulic punch with U-shaped frame and handle used for punching odd holes in framework of a ship.

Bearing Value of Rivets.—The strength of a riveted joint as determined by the bearing strength of the body of the rivet in the hole.

Beetle. See **Horse.**

Before.—Meaning forward of.

Bell Metal.—An alloy of about 75 per cent copper and 25 per cent tin.

Bell and Spigot Joint.—A joint made in piping by having a bell-shaped fitting on one end of one pipe and a spigot or projecting piece on the other pipe. The spigot is fitted inside the bell and the joint calked with oakum and lead.

Below.—Below a deck or decks (corresponding to "down stairs").

Bending. See **Stresses.**

Bending Floor. Same as **Bending Slab.**

Bending Moment.—The number of foot-pounds of bending at any point in the length of a ship due to the opposing forces of the weight of the ship and the buoyancy of the water. (Also used in designing beams.)

Bending Rolls. Large machine used to give curvature to plates.

Bending Slab.—Heavy cast-iron blocks arranged to form a large solid floor filled with square holes on which frames are bent.

Bent Plate Washer.—A bent plate connecting the bar keel to the garboard strake.

Berth.—A place for a ship.

Bessemer Steel. See **Steel.** See **Acid Process** and **Basic Process.**

Best Bower Anchor. See **Anchor.**

Bevel.—The angle between the flanges of a frame or other member. (When greater than a right angle, open bevel; when less, closed bevel.) Also means to change the angle of an anglebar by bending it.

Bevel Board.—A board marked off with numbers to give bevel (open or closed) from one frame to the next.

Bevel, Closed.—An angle less than a right angle.

Bevel-faced Hammer.—A riveting hammer with sloping face sometimes used to cut off rivet heads.

Bevel Lifter.—A vertical adjustable frame used in mold loft to set off correct bevel between adjacent frames.

Bevel, Open.—An angle greater than a right angle.

Beveling Lever.—A hand bar having two prongs at the end which is used to bend over the flange of an angle by hand.

Beveling Machine.—A machine connected with a long furnace in which a long angle is heated and as it comes out it runs through rolls which bend it to any bevel desired.

Bilge.[2, 4]—The rounded portion of the hull between the side and bottom. Also used to denote a fracture in sides or bottom of boat.

Bilge Blocks.—Same as keel blocks placed at edges of bottom of ship to support the bilges during construction or in dry dock.

Bilge Diagonal.—A diagonal line drawn on the body plan or scrive board from intersection of load water line and center line through the bilge keel.

Bilge Keel.[2]—A fore-and-aft member fitted to the outside of the shell plating running along the bilge, used to prevent excessive rolling of the ship.

Bilge Logs. See **Sliding Ways.**

Bilge Pump. See **Pump.**

Bilge Stringer.—A stringer inside the ship just opposite the Bilge.

Bilge Suction.—A section pump fitted into bilge gutters to suck out water.

Bilge Suction Pipe.—Pipes of lead or iron through which to pump water from the bilges.

Bilge Water.—Free water in the hold or tanks which collects in the bilges.

Billet.—A large piece of steel as it is worked down after going through the first few rolls.

Bitts.—Heavy steel castings fitted to the weather deck for securing mooring lines or hawsers.

Bitumastic Cement.—A patented paint for the inside of tanks to prevent corrosion, especially near boiler room.

Black Heat.—The upper limit of the critical temperature in tempering, about 650° Fahr.

Black Oxide.—A peculiar rust formed on iron by the application of water to hot steel.

Blast Furnace.—A large furnace about 100 feet high for melting the iron ore and producing pig iron.

Blind Port. See **Port.**

Blind Punching. To punch a plate with a diamond-shaped punch, but not allowing punch to go through the metal, thus making a raised diamond shape or "checkered plate."

Blister. See **Flaws.**

Block Coefficient. See **Coefficient of Fineness.**

Bloom.—A large piece of steel resulting from the ingot passing through the roughing rolls.

Blow Holes.—Air bubbles in liquid steel or cast iron which leave hollow spaces in the finished casting. (See **Flaws.**)

Blue Heat.—The lower limit of the critical temperature in tempering, about 400° Fahr. (See **Heat.**)

Boat.—A small vessel, such as a life boat, tug boat, etc.

Boat Chock.[1]—A wooden or metal piece cut to fit the under portion of a life boat while resting on the deck of a vessel.

Bobstay.—A downward stay extending from end of bowsprit to stern of vessel.

Body Plan.—An end view showing curves of the sides or frame lines at any point in the ship. Frame lines forward of midship section are on the right of the center line, aft of midship section, on the left of center line.

Boiler Point Head. See **Rivet Head.**

Boiler Stool.[2]—A heavy bracket made to fit the under side of the boilers and resting directly on the tank tops, floors, or keelsons.

Bollard.[2]—A large cast-iron cylindrical shape bolted to decks (usually placed just inside the mooring pipes) for fastening hawsers.

Bollard, Ventilating.—A bollard with hollow center used for ventilating compartments below.

Bolster, Circular.—Pieces of wood surrounding a mast upon which the shrouds are fastened to prevent chaffing.

Booby Hatch. See **Hatch.**

Boom.[1]—A long round heavy spar, pivoted at one end, usually used for hoisting cargo, etc.

Bosom Piece.—A short angle or butt strap for connecting the ends of angle bars; sometimes called "splice piece."

Boss.—The curved swelling portion of the ship's hull around the propeller shaft.

Bossplate.[3]—Plate bent to fit around the propeller shaft.

Boundry Plank.—A hard wood frame built around metal parts which extend above the deck and against which the wood decking is laid.

Bow.[1]—The forward end of a ship.

Bower Anchor. See **Anchor.**

Bow Frame.—The last frame forward in ships having no knighthead.

Bow Port.—A port in the bow of a vessel to allow the stowage of very long pieces of timber, etc.

Bow Rudder. See **Rudder.**

Bowsprit.—An inclined spar extending forward of the bow.

Bow Stopper. Same as **Cable Stopper.**

Box Beam.—A beam built up of structural shapes the inside of which forms a closed box.

Bracket.[2]—A small plate used to connect two or more parts, such as deck beam to frame, frame to margin plate, etc.

Bracket Floor. Same as **Skeleton Floor.**

Brass.—An alloy of about 32 per cent zinc and 68 per cent copper.

Braze.—To heat and join by means of hard solder.

Breaching.[2]—A Y-shaped pipe which connects the boilers to the funnel.

Breadth. See **Lloyd's Breadth.**

Break In.—To bend in a steel plate of a seam by too heavy calking.

Breaking Load.—The load which will cause a chain or test specimen to break, sometimes called ultimate load.

Breakwater.—A structure built on the deck of a ship to protect a companion from waves which might wash over.

Breast.—The outer edge of a launching way.

Breast Hook.[1]—A plate structure fitted inside the hull near the bow to give local strength to the shell plating.

Breast Piles.—The last piles driven at outer end of launching way.

Bridge.[1, 2]—The athwartship platform above the weather deck from which the ship is steered, navigated, etc.

Bridge Piece.[3]—The upper connection of a stern frame.

Brittleness. See **Flaws.**

Broken Stowage.—Projecting parts in a hold which interfere with the solid packing of cargo.

Bronze.—An alloy of about 80 per cent copper and 20 per cent tin.

Bronze, Phosphor.—An alloy containing 90 per cent copper and 10 per cent phosphor tin, the latter containing 5 per cent phosphorus.

Bucker Up. See **Rivet Squad.**

Bucket Conveyor. An endless chain with buckets attached used to load or unload grain or cargo from a hold.

Buckled Plate.—A plate which is thicker at the center than it is at the edges.

Buckled Plate.—A plate which is warped in or out at the center.

Buckling. See **Stresses.**

Building Sheds.—Enormous buildings of light steel framework and glazed roofs which enclose the whole ship and make possible work in all kinds of weather. This building also supports traveling cranes for erecting parts of the vessel.

Building Slip.—Place where the ship is built, before launching.

Bulb Angle.—An angle with one edge rounded to form a "bulb." Same with **Bulb Plates, Bulb Tees,** etc.

Bulkhead.[1, 3, 4]—A vertical water tight partition corresponding to the wall of a building, extending either athwartships or fore-and-aft.

Bulkhead, After Peak.[1]—A bulkhead just before the after peak tank to prevent the inrush of water in case of a fracture in the propeller shaft.

Bulkhead Boundry Bar.[4]—The outside bar of a bulkhead where it connects on to the frames.

Bulkhead Brackets.[4]—A gusset plate on the plane of the side stringer and connecting to the bulkhead to stiffen both.

Bulkhead, Cabin.[1]—Wooden partitions built around cabins.

Bulkhead, Collision.[1]—The last bulkhead forward which would serve as the front of the ship if bow was destroyed by collision.

Bulkhead, Corrugated.—A system of using corrugated metal for bulkheads and omitting the stiffener angles.

Bulkhead Deck.—The deck to which the bulkheads extend.

Bulkhead Doors.—Vertical watertight sliding doors in a bulkhead usually about 3 feet high and 2 feet wide, operated either by hand or by "quick closing" devices. (Should be avoided wherever possible.)

Bulkheads, Fireproof.—Fireproof partitions with fireproof doors built in passenger spaces above the bulkhead deck.

Bulkhead Floor.—The lowest plate of a bulkhead in a vessel having no double bottom, usually runs full width of ship. (See **Floor.**)

Bulkhead Liner.—A diamond shaped plate connecting edge of bulkhead to shell plate.

Bulkheads, Partial.—Vertical stiffening members placed under guns, etc., to take up recoil and prevent shearing of rivets.

Bulkhead, Screen.[1]—A portable sheet iron or corrugated iron screen fitted close to back of boilers to protect engine room from heat and coal dust.

Bulkhead Shoe.—The connecting angle around the base of a bulkhead.

Bulkheads, Side Bunker.—Longitudinal bulkheads placed around machinery spaces.

Bulkhead Sluice.—A small opening in a bulkhead for drainage which might be closed from the deck.

Bulkhead, Stepped.[1]—A bulkhead in which the upper portion does not come vertically over the lower section.

Bulkhead Stiffeners.[4]—Angle sections fastened to the plates of a bulkhead to stiffen it.

Bulkhead, Stuffing Box.[3]—Same as **After Peak Bulkhead.**

Bulkhead Vertical Web Stiffener.[4]—A web plate and angles provided at center of bulkheads over 36 feet high to stiffen bulkhead and relieve stresses on angle stiffeners.

Bulkhead, Wash.—A partial bulkhead in an oil or water tank to prevent the splashing of the oil or water when the tank is not full.

Bull Dozer. Same as **Beam Bending Machine.**

Bull Head. See **Rivet Head.**

Bull Riveting.—Riveting with compressed air or hydraulic plunger riveter.

Bulwark.[2]—The ship's side above the weather deck used as protection rail.

Bulwark Stays.[2]—An inclined brace from deck to bulwark to stiffen bulwarks.

Bunker.[1]—A compartment used for the stowage of coal or other fuel.

Bunker Door.—A small vertically sliding door in a bunker bulkhead to admit coal to stokehold.

Bunker, Pocket.—A conduit for passing coal from the 'tween deck bunkers to the stokehold.

Bunker, Reserve.—A small watertight cross bunker used either for coal or cargo.

Bunker Stays.[2]—Angle struts connecting frame of ship to bunker bulkheads to stiffen bulkheads.

Buoyancy.—Ability to float, or the difference between the weight of the ship and the upward force of the water that it may displace.

Buoyancy Reserve.—The volume of the water-tight hull above the load water plane.

Burned.—A term applied to a rivet which has been heated too hot.

Bushing.—A metal or lignum vitae inserted around a revolving part to take up the wear.

Butterfly Nut.—A nut with two large "wings" for tightening by hand.

Butt Joint.—A joint formed by "butting" the edges of plates together and covering with butt strap. (See **Riveted Joints.**)

Buttock.—The convexity of a ship aft under the stern.

Buttock Line. See **Lines.**

Button Head. See **Rivet Head.**

Button Plating.—Cast or blind punched plates having circular projections or "buttons" used for deck and ladder plates.

Butt Strap.—A small plate or other member used to connect the two parts of a butt joint by overlapping each. (See **Strap.**)

Butt Weld. See **Weld.**

Bumper. See **Fender.**

Burr. Same as **Slug.**

C

Cabin.[1]—That part of a vessel where the officers live.

Cabin Bulkhead. See **Bulkhead.**

Cabin Lining.—Tongue-and-grooved boarding about ¾ inch thick forming the side walls of cabin or storerooms.

Cable. Same as **Chain.**

Cable Holder. Same as **Cable Wheel.**

Cable Lifter. Same as **Cable Wheel.**

Cable Locker.[1]—A small compartment in hold or peak close to collision bulkhead for stowing the cable.

Cable Stopper.—A large casting for holding the anchor chain in case of accident to the windlass.

Cable Wheel.—A large drum on a windlass for winding up the anchor chain. (See **Windlass.**)

Calk.—To make a joint water tight.

Calker.—A man who makes seams tight in wood or metal. Calker usually means a metal calker. If wood calker is meant the term " wood calker " is used.

Calking Tool.—A thin, broad, blunt chisel for calking joints.

Camber.[2]—The rise or crown of a deck in the center above a horizontal line sometimes called "round up."

Camouflage.—To paint a vessel with all sorts of designs and colors to make it invisible at a distance.

Cant Frame.[1, 3]—A frame not square to the keel line extending over rudder forming stern of ship.

Cantilever Tanks. Same as **Gunwale Tanks.**

Cap.—A malleable cast-iron fitting which screws onto the end of a pipe to stop the flow of water. Also part of a watertight manhole cover.

Capstan.—A revolving device, with axis vertical, used for heaving in lines.

Car Float.—A barge designed to carry railway cars.

Cargo.—The freight carried by a ship.

Cargo Batten.—Strips of planking on the inside of the frames, in the hold, to keep cargo away from shell of ship.

Cargo Boom.—Heavy boom used in loading cargo.

Cargo Hatch. See **Hatch.**

Cargo Port. See **Port.**

Carlings.—Short girders, similar to headers, used to support the end of a beam where it is cut for a mast hole, hatches, etc.

Cat Head.—A small anchor davit.

Caulk.—Alternate spelling of **Calk.**

Cavitation.—The loss of thrust-producing power of a propeller when it is rotating so fast that the water will not follow it up.

Ceiling Planking.[2]—Timbers fitted on top of the tank top to serve as a floor for the cargo. (Usually 2½ inches thick.)

Cellular Double Bottoms.[2]—Space between inner and outer shells of a vessel divided by both longitudinal girders and transverse floors into separate compartments or cells.

Center of Buoyancy.—The center of gravity of the underwater portion of a ship.

Center Girder.[2]—The center line girder at the bottom of a ship which connects the keel and the keelson.

Center of Gravity.—The point at which the entire mass of a body could be concentrated and be equivalent to the original body.

Center Line.[1, 2, 4]—The middle line of the ship, from stem to stern.

Center Plate Rudder. See **Rudder.**

Center Punch.—A small round punch used by hand to mark the center of a rivet hole through the template.

Chain.—A series of links usually made of weldable iron. (See **Stud Link, Proof Stress,** and **Breaking Stress.**) Also meaning a heavy chain attached to anchor.

Chain Locker.[1]—Compartment in forward lower portion of ship in which anchor chain is stowed.

Chain Pipe.[1]—A vertical pipe through which the chain passes to the chain locker.

Chain Riveting. See **Riveted Joints.**

Chair.—A cast-iron or wrought-iron support used to keep steam pipes a few inches above the decks.

Chalk Line.—A cord used for marking with chalk.

Charcoal.—Used in powder form as insulating material.

Chart.—A map of the shore line showing soundings, etc.

Chart House.[1]—Small room under the bridge used for charts and navigational instruments.

Check.—Large cracks in the sides or ends of timbers caused by the shrinkage of the wood.

Checkered Deck Plating.—Cast or blind punched plates having diamond shaped projections used for deck and ladder plates.

Check Line. See **Lines.**

Check Plate.—The sides of a hound which is fastened to a mast.

Check Ring.[3]—Usually a brass ring about $\frac{3}{8}$ inch thick at base of pintle to allow lignum vitae strips to be removed without disturbing rudder.

Chintzed.—Lightly calked.

Chock.[1]—A heavy fitting through which ropes or hawsers may be led. Also used to denote seats or saddles of wood or metal.

Chrome Steel. See **Steel.**

Circulating Pump.—A large pump which circulates water through the condenser pipes to cool them.

Cleanout Door.—A door near the bottom of a furnace to allow ashes and clinkers to be removed.

Clearing Door.—A large fitting in the end of a soil pipe to provide for cleaning out the entire pipe.

Clearing Plug.—A threaded plug screwed into the bottom of a trap in plumbing to clean out dirt, grease, etc.

Cleat.[2]—A fitting attached to the deck, having two fore and aft arms or projections around which a rope or line may be secured.

Clevis.—A fitting with two flat projections on one end having holes through them to fit over a plate and hold a bolt and at the other end being similar to a turnbuckle.

Clinching Pan.—A flat plate for clinching nails. (Used in mold loft.)

Clinker Plating.—A method of applying steel plates to the side of a vessel by lapping one over another similar to shingles.

Clinker System.—A system of using flat plates on the side of a ship without joggling and filling space between such plate and frame with a tapered liner.

Clip.—A U-shaped metal clamp to hold a template to the steel plate, also a short angle bar connecting shapes and plates.

Closed Bevel. See **Bevel.**

Club Foot. See **Fore Foot.**

Coal Bunkers. See **Bunker.**

Coal Chute.[1]—A small opening in the deck to al coal to be run in, thus completely filling bunkers.

Coaling Port. Similar to **Cargo Port.**

Coaming.[1]—The vertical boundary of a hatch skylight.

Coefficient of Expansion.—The increase in lengt one inch of steel when raised 1° Fahr.

Coefficient of Fineness:

(*a*) **Midship.**—A decimal obtained by dividing area of the midship section by its circ scribing rectangle.

(*b*) **Water Plane.**—A decimal obtained by divic the area of the water plane by its circ scribing rectangle.

(*c*) **Block.**—A decimal obtained by dividing total underwater volume of a ship by volume of a block having same length, brea and depth as the ship.

(*d*) **Prismatic.**—A decimal obtained by dividing total volume of the underwater portion c ship by the volume of a prism having same length as the ship and constant sect equal to the area of the midship section.

Cofferdam.—The space between two bulkheads loca very close together.

Cogging Rolls. See **Rolls.**

Cold Bend Test.—To bend a piece of steel 180° around a pin of radius equal to 1½ times thickness of piece.

Cold Flanging.—To turn up the edge of a plate (such as a garboard plate) while the metal is cold.

Cold Rolling.—To continue the rolling of plates after they have cooled below a red heat, which increases the strength of the plate.

Cold Shortness.—Brittleness in a steel plate after it is cold, caused by too much phosphorus in the steel. (See **Flaws.**)

Collars.—Plates or angles forged to fit around outstanding legs of angles or webs to make joint water tight.

Colliers.—Vessels designed to carry cargoes of coal.

Collision Bulkhead. See **Bulkhead.**

Collision Chocks.[1]—Heavy brackets fitted fore and aft of boilers and connecting to bottom frames to take up the impact in case of a head on collision, thus preventing bursting of pipes, etc.

Columns. See **Pillars.**

Combined Stresses. See **Stresses.**

Commercial Efficiency.—A decimal obtained by dividing the weight or bulk of a ship's net cargo by her size or weight. (Sometimes also applied to first cost.)

Companion.[1]—An entrance and cover to a stairway leading from the weather deck to the cabin spaces below.

Compartment.—A subdivision of space or room in a ship.

Compensation.—The adding of doubling plates around hatchways, etc., to make up for loss in area of deck plates.

Composite Vessel.—A vessel, the framework of which is made up of two materials such as steel and timber.

Compression. See **Stresses.**

Concrete Ballast.—A mixture of cement, sand, rock and scrap iron, steel, etc., which is poured around the keel or keelson to serve as ballast.

Condenser.—An attachment on a distilling apparatus to liquefy the steam.

Condenser Head.—Connection of exhaust pipe to top of condenser.

Conodite. Same as **Litosilo.**

Contour of Rudder. See **Rudder.**

Contraction Flaws.—Cracks in a piece of steel or cast iron caused by the mass cooling too rapidly. (See **Flaws.**)

Copper Float.—A hollow ball or box of copper in an air trunk to close the valve when water tries to get down the air duct.

Coppersmith.—A man who bends and fits all kinds of copper or brass tubing.

Corrosion.—The oxidation of iron in impure or salt water, forming first as a light red coat and progressing to a deep red rust scale which is from 4 to 6 times bulkier than the iron.

Corrugated Bulkheads. See **Bulkheads.**

Counter.[1, 3]—That part of the stern below the knuckle line. Same as **Overhang.**

Counterplates.—Shell plates around the stern at the upper or weather deck.

Countersink.—To enlarge the upper part of a hole in order to make a flush rivet.

Coupling.—A malleable cast-iron fitting threaded on the inside at both ends to couple two pipes together.

Covering Strakes. See **Strakes.**

Cow Hair.—Used as insulating material in small spaces.

Cowl Ventilator. See **Ventilator.**

Cradle.—A form of plates and angles on which a plate is shaped by the furnace man. (See **Making Up.**)

Crane.—A hinged fitting holding the topsail yard out from the mast cap. (See **Traveling Crane.**)

Crank Ship.—A vessel which is easily inclined sideways due to having a small metacentric height.

Cress. Same as **Die.**

Crimp. Same as **Joggled.**

Critical Temperature.—The temperature at which the carbon in steel changes its form and above which it is impossible to temper the steel, from 400° to 650° Fahr.

Cross Bunkers.—Coal bunkers running athwartships.

Cross Head.—A tee-shaped casting connecting the rudder head to a hand steering wheel.

Cross Tree. Same as **Trestle Tree.**

Crow's Nest.—A perch at the mast head for observation.

Cruiser Stern.—A large bulged-out shape to the poop.

Crutches.[1] Same as **Breast Hooks** at the stern of a vessel.

Crystallization.—The failure of steel, after being in service a long time, caused by the steel forming crystals due to vibration.

Cup Head. See **Rivet Head.**

Cupola.—A small blast furnace used to melt pig iron or scrap iron to be poured into molds to make cast iron.

Curve of Area of Midship Section.—A curve showing what the area of the midship section would be up to any draft.

Curve of Bending Moment.—A curve showing what the bending moment would be at any point in the length of a ship.

Curve of Buoyancy.—A curve showing the amount of the upward force of the water at all sections of a vessel.

Curve of Shearing Force.—A curve showing the amount of shear at all points in the length of a vessel.

Curve of Stability.—A curve showing the righting moment at all angles of inclination of a vessel.

Curves. See name of each curve.

Cut Water. Same as **Stem.**

D

Dagger.—A short bar of steel about 2½ inches square which acts as a trigger to release the ship in launching, when dog shore is knocked out by a falling weight.

Daily Supply Tank. See **Tank.**

Davit.[1]—Heavy vertical pillar, of which the upper end is bent to a curve, used to support the end of a boat when hoisting or lowering.

Davit, Anchor.—A davit for lifting the anchor.

Davit, Fish. Same as **Anchor Davit.**

Davit, Pipe.—A vertical pipe on a wharf with upper end bent over to which a hose pipe is fastened to pump oil or water into a vessel.

Davit, Welin.—A patent davit which swings the small boat out on a rocker arm instead of rotating about a vertical axis.

Dead Eye.—A solid circular block without sheaves through which lanyards, etc., are tightened up.

Dead Flat.[1]—The length of a ship near its center where the section is the equal to the midship section.

Deadrise.[1]—The vertical distance between the point where the slope of a vessel's bottom intersects the molded breadth line and the base line.

Deadweight.—The total weight of cargo, fuel, water, stores, passengers, and crew, and their effects, that a ship can carry.

Deck.[1, 2, 3, 4]—The part of a ship that corresponds to the floor of a building.

Deck, Awning.[2]—The uppermost deck covered only by an awning.

Deck Beam.[2]—Athwartship support of deck.

Deck, Flush.—A vessel having no decks above main deck.

Deck, Forecastle.[1]—A short deck in the forecastle of a ship.

Deck Girder.[2]—A large deck beam used to support the decks where pillars are omitted.

Deck Height.[2]—The vertical height from the top of a deck to the top of the next deck above.

Deck House.[1]—A steel or wooden house on the deck of a ship.

Deck Load.—Cargo stowed above deck...

eck Plan.[1]—A drawing showing the layout of a deck.

eck Plating.[1]—Steel plates riveted together and calked to form the deck.

eck, Poop.[1, 3]—The upper deck of the poop.

eck, Promenade.—Next deck above main deck.

eck Pump. See **Pump.**

eck, Quarter.—That portion of the weather deck nearest the stern.

eck, Raised Quarter.—The after portion of the upper deck raised 3 or 4 feet to a higher level.

eck, Shelter. Same as **Awning Deck.**

eck Stringer.[1]—The strip of plating that runs along the outer edge of a deck (forming a part of the deck plating).

eck, Upper.[1, 2, 3, 4]—The highest complete deck.

ecking.[2]—Wood, canvas, or other material used to cover a deck.

eep Stowage.—To pile up the cargo in a deep hold having no separate decks.

eep Tank.—A ballast tank placed amidships for the purpose of sinking the vessel bodily in the water so that her weathering qualities may be maintained at sea.

eflection.—The amount a beam of the ship bends from the horizontal under a load.

Depth.—The distance between the top of the upper deck beam at the side to the base line of the vessel measured half way between forward perpendicular and after perpendicular. (See **Lloyd's Depth.**)

Derrick.[1]—Inclined compression member held by cables used to pick up heavy loads.

Derrick Post.—Vertical member to hold derrick, sometimes made hollow and combined with ventilator.

Detective Line.—A line drawn 2 inches out from the edge of a plate from which measurements may be made to see if the edge of the plate is on its correct line.

Development.—A full-sized or developed pattern.

Diagonals. See **Lines.**

Diagonal Ties.—Diagonal metal ties running from one side of a vessel diagonally across to opposite side to stiffen decks where deck plating is not used.

Diamond Plates.—Diamond-shaped plates connecting the web frames to the side stringers and acting as brackets to stiffen the framework.

Diaphragm.—Usually a web plate with flange angles placed between two other members to stiffen them laterally.

Die.—A cast-steel pattern used in a hydraulic press or a steam hammer to give the proper shape to a fitting.

ie.—A tool for forming a rivet head (applied to rivet dies).

(*a*) **Flush Die.**—To flatten rivets into a countersunk hole.

(*b*) **Snap Die.**—To form a round head. (See **Rivets.**)

ismast.—To remove the masts from a ship.

isplacement.—The total weight of the ship when afloat, including everything on board.

isplacement Curve.—A curve showing what the displacement of the vessel would be, floating at any draft.

istilling Apparatus.—Machinery for distilling sea water to provide fresh water for the ship.

istribution Box. Same as **Valve Chest.**

ock.—A horizontal platform supported by piles built out into the water to allow vessels to receive and discharge cargo, etc., also meaning to tie a vessel up to a dock.

ocking.—The making fast of a vessel to a dock.

og.—A small bent metal fitting used to close doors, hatch covers, manhole covers, etc. Also used to denote an L-shaped bar of round iron about 1½ inches diameter, used on a bending slab to hold the wedges and finished pieces to the slab.

og Shore.—A short piece of wood which acts as a trigger to hold dagger in place until launching.

olly.—A heavy bar with depression shaped like a rivet head which is held against the rivet while the other head is being riveted.

Donkey Boiler.—Small boilers usually used to drive winches, deck machinery, pumps, ventilating machinery, etc.

Door.—The inner part of a watertight manhole cover.

Double Bottom.[1, 2, 4]—Compartments at bottom of ship between inner and outer bottoms, used for ballast tanks, water, fuel oil, etc.

Double Shear. See **Shear.**

Double Sides.—Water ballast tanks formed between sides of a vessel and inner siding, similar to double bottoms.

Double Riveted Joint. See **Riveted Joints.**

Doubling Plate.[1]—A plate fitted outside or inside of another to give extra strength or stiffness. Often put around an opening.

Dowel.—A short metal pin fitted into two adjacent parts to keep them from moving on each other.

Downton Pump. See **Pump.**

Draft.[1]—The vertical distance of the lowest part of the ship below the surface of the water when she is afloat.

Drag.—The amount that one end of the keel is below the other when the ship is afloat but not on an even keel.

Drags.—Heavy weights fastened to a ship by hawsers during launching which causes ship to come to a stop before it bumps into anything on the other side of the launching channel.

Drain Holes.—Small holes drilled through both floor and frame angles to drain water from bilge gutter.

Drain Hole Plug.—A brass threaded plug fitted over the drain holes to prevent water passing through.

Drift.—To pull two rivet holes in line with each other by use of a drift pin.

Drift Pin.—A small tapered tool used to draw adjoining parts together by driving it into these holes so that the rivet holes will come fair.

Drilling Machine.—A vertical machine for drilling holes in steel plates and may be arranged as a gang drill, drilling as many as twenty holes at one time.

Drip Pan.—A cup-shaped pan placed under the bearings, etc., of a line shaft to catch oil which might drip out.

Dry Dock.—A floating (or stationary) box-shaped structure into which vessels may be towed and the water pumped out from around the vessel for purposes of investigation or repairs of the ship.

Drying Room.[1]—Room just over boilers and next to funnel used to dry linen, crew's washing, etc.

Dry Rot.—The decay of a piece of timber which is always kept dry, by fungus growth.

Ductility.—Ability of a metal to be "worked" without breaking.

Dull Red Heat. See **Heat.**

Dunnage Wood.—Waste pieces of timber of all sorts placed between the ceiling planking and a perishable cargo.

E

Eddy.—A small whirlpool formed just aft of the propellers.

Edge Strip.—A narrow strip of metal placed under the joint in plates in the flush system.

Edge to Edge System.—A system of butting flat plates directly against the frame and covering the joint with outside covering strakes.

Elastic Limit.—The stress a piece of metal can hold and still return to its original dimensions upon removing the load, without leaving any set.

Elastic Quadrant. Same as **Loose Quadrant.**

Elbow.—A malleable cast-iron fitting for wrought-iron pipe, making a right angle turn.

Electric Arc Welding.—Welding two pieces by connecting one to the positive wire and the other to the negative wire of an electric circuit and causing a very high temperature by an electric arc. (See **Welding.**)

Electric Drill.—A small electric motor attached to a drill which is worked by laying the piece to be drilled flat on ground or deck, pressure being applied by operator putting his own weight on it.

Electric Hydraulic Steering Gear. See **Steering Gear.**

Electric Steel. See **Steel.**

Engine Room Plumb Bob.—A plumb bob suspended in the engine room to tell the engineer whether the ship has a list or not.

Engine Seating.[1]—The foundation for engines.

Equilibrium.—The state of a vessel when the forces on all sides of it exactly balance each other. (See **Stable, Unstable, Neutral,** and **Mixed.**)

Equipment.—Anchors, cables, tow ropes, wrapping, mooring lines, etc., which are specified by Lloyd's for each ship according to its equipment numbers.

Equipment Number.—$L(B+D)$ See **Lloyd's Numbers.**

Equivalent Girder.—A theoretical girder having the same area at all heights as the total area of all parts of the framework of the vessel at that height.

Erection.—The process of hoisting into place and bolting the various parts of the ship's hull, machinery, etc.

Escape Holes.[1]—Small manholes in the deck remote from the hatchways used for the trimmers to get out after filling a bunker with coal. Sometimes also used to fill remote corners of the bunkers with coal.

Even Keel.—A ship is said to be on even keel when the keel is level, or parallel to the surface of the water.

Exhaust Ventilator. See **Ventilator.**

Expansion. See **Stern Expansion** and **Expansion Plan of Shell.**

Expansion.—The lengthening of a plate or frame due to a rise in temperature.

Expansion Bend.—A bent section of pipe usually made of lead to allow pipe to expand or contract without causing leak.

Expansion Hatch. See **Hatch.**

Expansion Plan of Shell.—A drawing having the correct position, size and mark of every shell plate, including bottom and sides of a vessel (which makes drawing look distorted, being correct length but expanded vertically).

Expansion Trunk.—An oil-tight compartment placed over an oil tank in a bulk oil carrying vessel to keep tank full at all times and prevent violent splashing.

Extreme Fiber.—The edge of a beam farthest from the neutral axis. (See **Section Modulus.**)

Eye Bolt.—A bolt formed with an eye or ring at one end.

Eyebrow.—A term often applied to a wriggle.

F

Fabricate.—To punch, cut, shear, drill, bend, flange, or weld plates and shapes.

Factor of Safety.—Ultimate strength divided by working stress.

Fair.—Smooth; without abruptness or unevenness, in agreement. Fairing the lines consists in making them smooth. Rivet holes are fair when they agree with one another in adjoining members.

Fairlead.[1]—A small fitting through which a rope, line, etc., may be led so as to change its direction without excess friction. Either a casting or a roller.

'air Ship.—Too keep a ship square upon the ways during construction.

'air Up.—To adjust work in proper position.

'alling Home.[2] Same as **Tumble Home.**

'alse Keel. See **Keel.**

'athom.—A measure of depth of water, six feet.

'atigue.—The failure of steel after a long period of use in which the stress reverses from tension to compression.

'aying Surface.—The side of a plate in contact with another plate. Holes should be punched from this surface.

'eather Edge Chaffing Pieces.—Wedge-shaped pieces of steel placed opposite the lap of plates to prevent chaffing of cables or cargo.

'elt.—Used in thin cakes as insulating material in small spaces.

'ender.—A bumping piece near the water line, made of timber or steel to receive impact from docks, piles, etc., and protect shell plating.

'iber in Wrought Iron.—The grain produced by small particles of slag being rolled out into threads.

'id.—A metal dowel fitted into the bottom of a mast to hold it rigidly to its support.

'iddied Mast.—A mast having its base held in place by a fid.

Fiddley Grating.[1]—An open cast-iron grating around funnel which is always kept open for insulation and ventilation.

Fidley Hatch. See **Hatch.**

Fillet.—The small rounded corners inside of rolled steel sections; as angles, channels, beams, etc.

Finder Point Punch. See **Punch.**

Fined. Same as **Ship Shaped.**

Finishing Rolls. See **Rolls.**

Fire Control.—Means of informing men at the guns how to set the sights, at what target to fire, etc.

Fire Engine Pump. See **Pump.**

Fire Extinguishing by Carbonic Acid Gas.—Injecting liquid carbonic acid gas at 10° Fahr. into hold, which extinguishes fire by its great expansion and coldness.

Fire Extinguishing by Flue Gas.—A process of diverting the flue gases through a washer and cooler and pumping into hold to extinguish fire.

Fire Extinguishing by Live Steam.—Spraying live steam into a hold to extinguish fire.

Fire Extinguishing by Sulphur Dioxide.—Pumping the fumes from burning sulphur through a hold to extinguish fire.

Fire Main.—A large pipe used only to supply water to the fire hydrants from the fire engine pump.

Fireproof Bulkheads. See **Bulkheads.**

Fish Davit. See **Davit.**

Fixed Way. Same as **Launching Way.**

Flagstaff.—Flagpole at stern of ship.

Flam. Same as **Fairing.**

Flange.—Portion of a plate or shape at, or nearly at right angles to main portion. Also used to denote bending of plates to form an angle.

Flange of a Girder.[2]—The angles and cover plate at top or bottom which carry the tension and compression.

Flange Joint.—A joint made in pipe by having a right angle flange on each pipe and fastening together with bolts.

Flap.[2]—A hinged fitting put into the end of a storm valve to prevent water flowing upward in the pipe.

Flaring.[2]—Same as **Tumble Home.**

Flash Point.—The temperature at which any oil will give off a gas which could be ignited by a match.

Flat.—A small partial deck, built level, without curvature.

Flat Plate Keel. See **Keel.**

Flattened Head. See **Rivet Head.**

Flattener.—A machine for flattening out buckled plates. (See **Mangle.**)

Flattening Iron.—A tool similar to a sledge hammer having a broad flat face which is used to flatten an angle when bevelling it.

Flaws in Steel:

Blisters.—Raised projections on the surface of steel pieces caused by bubbles of gas getting under skin of metal.

Blow Holes.—Cavities in a steel casting formed by air bubbles.

Brittleness.—Lack of ductility in steel due to presence of phosphorus.

Internal Stresses.—Tension or compression existing on a piece of steel caused by improper working of temperature.

Piping.—A hollow center in a steel bar caused by shrinkage of the metal when molten.

Red Shortness.—Ragged appearing edges on a steel plate caused by too much sulphur in the steel.

Segregation.—The collection of impurities into spots in a steel plate, causing weak places.

Soundness.—The absence of Blow Holes in steel.

Vents. Same as **Blow Holes.**

Floating Power.—The difference in weight between any body and the weight of water it would displace if entirely under water.

Float Valve. See **Valve.**

Flogging Stresses. Same as **Pounding Stresses.**

Floodable Length.—The percentage of a ship's length which, when flooded, will submerge her to within 3 inches of the bulkhead deck at side. (See **Margin Line.**)

oor.[2]—The lower portion of a transverse frame, usually a *vertical* plate extending from center line to bilge, and from inner to outer bottom.

ush.—To wash out with water.

ush Countersunk Head. See **Rivet Head.**

ush Deck. See **Deck.**

ush Rivet. See **Rivet.**

ush System.—A system of using flat plates on the outside of a ship with ends butted together and sealed with a continuous edge strip inside, staggered with frame liners.

lux.—Limestone added in a blast furnace or cupola to collect impurities into the slag.

lux.—A material added to a joint to be welded to prevent oxidation during the weld (usually rosin or acid).

oot Pound.—The force necessary to raise one pound one foot vertically.

orced Draft.—Closing all doors of a stokehold and allowing fans to keep stokehold under higher air pressure, thus forcing a better draft and increasing steam generating power.

orce Pump. See **Pump.**

ore and Aft.—In line with the length of the ship, longitudinally.

ore and Afters.[1]—The longitudinal pieces over a hatchway supported by cross beams.

Forecastle.—The forward upper portion of the hull, usually used for the crew's quarters. (Pronounced "Fo'c'sle.")

Forecastle Deck. See **Deck.**

Fore Foot.[1]—Point where keel turns up to join stern. A broad rounding fore foot is called a club foot.

Fore Mast. See **Mast.**

Fore Peak.—A large compartment or tank just aft of the bow in the lower part of the ship.

Fore Peak Tank.[1] See **Trimming Tank.**

Forging.—A mass of steel worked to a special shape by hammering while red hot.

Fort Valve.—A valve inside a pump which allows water to be pumped out and prevents running back.

Forward.—Near or toward the bow.

Forward Perpendicular.[1]—The vertical line where the bow cuts the load water line.

Foul.—To allow the bottom of a ship to become covered with barnacles, etc., making the resistance to passage through the water much greater. To foul a rope is to tangle it up.

Foul Berth.—A place for a ship to dock which has shallow water and where the bottom is rough, which would cause dangerous stresses on the ship's bottom if allowed to ground.

Foundation Plate.—A heavy steel plate on which the keelson rests.

Frame.—A structural rib bent and beveled to fit the section of the ship and placed at right angles to the keel, extending from the bilge to the bulwark. (Sometimes called **Rib.**)

Frame, Cant. See **Cant Frame.**

Frame, Knighthead.—The last frame in bow of ship having a bowsprit.

Frame Liners.—Filler plates placed between the frame and outer strake in the in-and-out system.

Frame Lines. See **Lines.**

Frame Mold.—Template for the frame of a ship.

Frame, Propeller.[1] Same as **Stern Frame.**

Frame Spacing.—The fore and aft distance between adjacent frames.

Framing.—The support and stiffening of the shell plating, deck plating, etc., usually consists of the ordinary transverse frames or "ribs," beams, floors, etc., and the longitudinal framing or keel, keelsons, longitudinals, stringers, to which the shell is riveted. (See **Frame.**)

Freeboard.[1]—The vertical distance from the upper watertight deck or top of bulwarks to waterline, when ship is fully loaded.

Freeboard Marks.—Marks put on the side of a vessel by Lloyd's to indicate the water line and insure that the ship maintains its freeboard.

Freeing Port. See **Port.**

Free Water.—Water having a free surface.

Fresh-water Tank.—A large cistern placed on top of the machinery casing to supply the whole vessel with fresh water.

Frictional Resistance.—The resistance offered by the water to the passage of the vessel through the water.

Friction Brake.—A patent brake attached to the tiller to prevent the rudder swinging free in case of a breakdown, before the hand steering gear is attached.

Friction Saw.—A large steel saw with notches cut into its edge which rotates at a tremendous speed and cuts off steel beams by friction or heat.

Full Countersunk Head. See **Rivet Head.**

Full Scantling Ship.—A three-deck ship in which the frames are carried full size to the upper continuous deck.

Fumigating.—Filling a hold or cabin with sulphur dioxide gas as a germicide or disinfectant.

Funnel Casing.—A shell of insulating material several inches thick built around funnel to insulate it.

Funnel Ventilation. See **Ventilation.**

Furlong.—One eighth of a mile.

Furnace. Same as **Salamander.**

Furring.—Strips of wood bolted to frames of ship to hold cabin or storeroom lining.

G

Gallant Rail.[2]—Top rail of bulwark just above main rail.

Galley.[1]—The " kitchen " of a ship.

Galley Dresser.—A cook's work table.

Galley Shoot.—An inclined shoot running from the galley overboard and flushed by a sanitary tank.

Galvanizing.—Coating metal parts with zinc for protection from rust.

Gang Drill. See **Drilling Machine.**

Gangway. A passageway, a ladder or other means of boarding a ship.

Gangway Doors.[1]—Large doors in the bulwark either hinged fore and aft, or hinged down on the side of the ship to admit gangway or freight chutes.

Gangway Ladder. Same as **Accommodation Ladder.**

Gantry. See **Traveling Gantry.**

Garboard Strake. See **Strake.**

Gas Washer. See **Air Washer.**

Gauge.—The distance from the ba of an angle to the rivet line.

Gauge Line.—The line on which rivets are driven in an angle or beam.

German Silver.—An alloy of about 20 per cent nickel, 30 per cent zinc, 50 per cent copper.

Girder.—A longitudinal member supporting beams.

Goose Neck.—Adjustable U-shaped pipe connection to make connections through different pipe lines.

Goose-neck Ventilator. See **Ventilator.**

Grab-stand.—A special rig used to hold an electric or air drilling machine.

Grade Line. See **Lines.**

Gradient.—The slope per foot of the ground ways in launching.

Grain.—The annual rings in timber.

Grain Feeders.—Reservoirs built just above grain holds, similar to oil trunks, to keep holds full of grain and prevent shifting.

Granulated Cork.—Cork ground up and pressed into thick slabs used as insulating material around ice boxes and funnel casings.

Graving Piece.—A piece of wooden decking inserted in an old deck to replace a decayed piece.

Grip.—The rope used to hold a life boat in its chocks; also the distance between heads of a rivet.

Gromet.—A thread of oakum dipped in thick paint which is wrapped around a bolt before tightening it to make it watertight.

Gross Tonnage.—The total internal capacity of a ship, obtained by dividing the total volume of the ship, in cubic feet, by 100.

Ground.—Strips of wood or metal to which ceiling is fastened. (See **Furring.**)

Grounding.—The running of a vessel on to submerged ground.

Ground Ways.—Timbers fixed to the ground, under the hull on each side of the Keel, on which she is launched. (See **Launching Ways.**)

Gudgeon.[3]—Fitting on which rudder swings. The gudgeons fit around the pintles, and form a part of the rudder post.

Gun.—A name applied to a hand compressed air riveter.

Gun Metal.—An alloy of about 90 per cent copper and 10 per cent tin.

Gun Platform.[1]—A structural steel platform built on the forecastle deck and poop deck, fore and aft, to support the gun and absorb its recoil.

Gunwale.—The side of a ship at the edge of the weather deck.

Gunwale Bar.—A continuous angle connecting gunwale to stringer plate.

Gunwale Tanks.—Water-ballast tank sections fitted under the gunwales.

Gusset Plates.[2]—Brackets connecting tank top and frames. (Also used in other places.)

Gutter.[2]—A rounded depression at outer edge of decks to drain off water.

H

Half Breadth Plan.—A top view showing a horizontal or floor plan on any water line. (See **Lines Plan.**)

Hammer Point Head. See **Rivet Head.**

Hand Riveting. See **Riveting.**

Hang.—To support a vessel by bilge blocks and shores without keel blocks as when it becomes necessary to repair the outer bottom or remove a number of "floors."

Hanging Keel. See **Keel.**

Harpin.—A curved wooden piece used to hold frames at ends of ship in position when first erected.

Hatch.—Opening in deck of vessel through which cargo, coal, etc., is loaded.

Hatch Batten.—Narrow strips, usually of wood, which are fitted tight against the coamings to hold the hatch covers.

Hatch, Booby.—A wooden cover used to cover a hatchway and having a shutter to act as a companion way.

Hatch, Cargo.—Large openings in a deck to permit loading of cargo.

Hatch Coamings.[1]—The vertical plates around the edge of a hatchway.

Hatch Cover.[1]—Two or three thicknesses of tarpaulin over a hatchway and hanging over coaming against which the hatch battens are pressed.

Hatch Expansion.—A hatch over an expansion trunk. (See **Trunk.**)

Hatch, Fidley.—Hatch around smokestack and uptake.

Hatch Section.—A rolled steel section similar to a Z-bar covering a half round on one side and used around hatches to receive the hatch covering.

Hatchway.—The vertical opening under a hatch.

Hawse Pipe.[1]—A pipe in the bow of a ship for housing the anchor chain.

Hawser.—A large rope.

Head Sea.—Waves coming at a ship head on.

Heat, Blue.—A temperature of steel ranging from 400 to 650° Fahr.

Heat, Dull Red.—A temperature of steel about 1000° Fahr.

Heat, Melting.—A temperature of steel about 2700° Fahr.

Heat, White.—A temperature of steel of about 2200° Fahr.

Heater, or **Heater Boy.**—One who heats rivets.

Heating Tongs.—Tongs used to take a rivet from the fire.

Heel.—The recoil produced by gunfire. Also the tendency of a vessel to turn over due to shifting of cargo or other reason.

Helm.—The direction to which the tiller is put, or opposite to which the rudder is put. (When the rudder is to port the ship is said to carry starboard helm.) Also used to denote the whole apparatus by which the ship is steered.

Hex Nut.—A term applied to a six-sided nut. (Hexagonal.)

Hinged Lid.—A removable cover kept over a pump chamber and removed when Deck Pump is inserted.

Hobby. Same as **Dolly.**

Hogging. See **Stresses.**

Hoisting Line.[1]—The rope running from the sheave block of a derrick to the winch.

Hold.[1]—A large compartment in the lower part of the ship for cargo.

Hold Beams.[2]—Beams in a hold, similar to deck beams, but having no plating or planking on them, also having no camber.

Hold-beam System.—A method of providing strength in the frame of a ship by putting beams across between every tenth frame. These beams have no camber.

Holder-on. See **Rivet Squad.**

Hold Fast. Same as **Dog.**

Holding down Bolts.—The bolts which hold the engine to its seating.

ollow Ways.—A ground way with a groove in it to keep the boat going straight in launching. The sliding way has a projection on it which just fits this groove, thus eliminating the use of rib-bands.

oneycombed.—A piece of timber which has small checks all through it, a section of it looking like a "honeycomb."

ook Stick.—A rig used to hold drilling machine for light drilling.

orn.—To line or square up.

orse.—To calk a joint, using two men, one swinging a large sledge or beetle, and the other holding the calking tool with a fixed handle.

orseshoe Collars.—Collars fitted around the shaft in a thrust block to take the thrust from the propeller shaft.

ot Test.—To flatten a rivet out under a steam hammer while hot to see whether it cracks at the edges.

ound.—A projection on a mast to hold the top mast.

ydraulic Derrick.—A self-contained derrick operated by water pressure through rams, pulleys, chains, etc. Used only on high class passenger ships.

ydraulic Ram.—A piston moving in a cylinder which operates by water power and is capable of exerting a tremendous pressure. Often used to start a ship in launching.

ydraulic Riveter. See **Riveting.**

Hygroscopic. The acceleration of corrosion of iron when coated by a scale of rust, caused by the accumulation of moisture between the rust scales and the iron.

Hull.—The body of a ship, including shell plating, decks, bulkheads, etc.

Hull Efficiency.—A decimal obtained by dividing the product of the resistance and speed of a vessel by the product of the thrust and speed with which the propeller passes through the water.

Hull Number.—A number assigned to one ship and by which every part of the ship is marked to distinguish it from any other ship in assembling.

I

Ice Doubling.—Extra plates riveted from bow to collision bulkhead to reinforce against dents and damage due to floating ice.

In-and-out System.[2]—A system of staggering strakes in the outside shell of a vessel keeping one plate, inside (inner strake) and the other outside (outer strake) and filling the space under the outer strake with frame liners of shell packing.

Inboard.—Inside the ship, toward the center line.

Inboard Profile.[1]—A longitudinal section through a vessel.

Inclining Experiment.—An experiment performed on a vessel by moving weights from one side of the vessel to the other and noting the deviation of a plumb bob in order to determine the metacentric height.

creasing Power Gear.—An eccentric toothed wheel connected to the rudder head and engaging a flattened quadrant to make it easier to move the rudder.

dicating Mechanism.—A device on the bridge of a vessel to indicate whether the bulkhead doors are open or closed.

got.—A large piece of steel as it is poured from the open hearth furnace or Bessemer converter.

ner Bottom.[2, 4]—Plating forming the upper boundary of the double bottom. Also called tank top.

sulated Hatch Cover.—A hatch made of the same material as an insulated hold and fitted over the hatchway.

sulated Hold.—A hold protected by several inches of material which will not transmit heat and is used to stow perishable goods.

sulating.—Asbestos covering put over steam pipes.

tegraph.—An instrument which could follow around the perimeter of a curve of loads of a vessel and draw the curve of shearing force or bending moment.

tegrator.—An instrument which could follow around the perimeter of a drawing and read off the moment of the area, or the moment of inertia of the area.

tercostal.[1]—Made in separate parts between frames beams, etc.; the opposite of continuous. (Floors are continuous; longitudinals, intercostal in a merchant ship.)

Intercostal Keelson. See **Keel.**

Internal Stresses. See **Flaws.**

Iron Wood.—A very hard South American wood used for treenails and dowels.

Isherwood System.—A system of building ships in which the main framing is longitudinal, or fore and aft, instead of transverse as in ordinary ships.

J

Jackstaff.[1]—Flag pole at bow of ship to support the Jack.

Jalousie Framing.—A system of tongue and grooved boarding used in cabin doors to admit light and air, but making it impossible to see through them.

Jam Hammer.—A special type of holding-on hammer used in heavy riveting.

Jib Boom.—A small spar extending forward from bowsprit.

Joggle.—To bend plates and shapes to fit over other work and avoid the use of liners.

K

Kedge.—To throw an anchor out to one side of a ship and drift around on this anchor, thus changing the position of the ship in the water.

Kedge Anchor. See **Anchor.**

Keel.[1, 2]—The fore and aft member, usually in the form of flat plates end to end, extending from stem to stern along the bottom of a ship on the center line.

Keel Bar.—An exterior bar suspended from main keel to strengthen it.

Keel Blocks.—Short timbers built up from the ground to support the keel during construction or in dry dock.

Keel, False.[2]—A timber sometimes bolted on to under side of keel to take up wear and impact in case of grounding and thus protect the keel.

Keel, Flat Plate.[2]—A flat horizontal plate used as the bottom part of the keel.

Keel, Hanging. Same as **Bar Keel.**

Keel, Vertical.[2]—Row of plating extending vertically along center of flat plate keel. Sometimes called **Center Keelson.**

Keels, Side Bar.—Two or more extra bars riveted to side of bar keel to give it more strength.

Keelson.[2]—An auxiliary keel or stringer, extending along and over, or parallel to the keel. The center vertical keel.

Keelson, Intercostal.—A discontinuous web and angles just over the keel which fits in between the floors.

Keelson Side.[2]—A longitudinal girder between the outer bottom and the tank top and parallel to the keel.

Keyed Tiller. See **Tiller.**

King Post.—A vertical column supporting several derricks.

Knee.[2]—A bracket connecting a beam to the frame. (See **Beam Knee.**)

Knee, Slabbed.—A knee formed by welding a slab to under side of beam and riveting to frame.

Knee, Turned.—A knee formed by turning the lower flange of a beam down and making knee continuous with beam.

Knighthead Frame. See **Frame.**

Knot.—A nautical mile, 6080 feet. (One minute of longitude at the equator.)

Knuckle Line.[1]—The sharp intersection line between the poop plating and the stern plating at the stern of the ship.

L

Ladder.—Same as "stairs" in a building.

Ladders, Pillar.—Ladders made up of two pillars about one foot apart connected by rungs or steps.

Lamination.—The separating of a steel plate into leaves or layers by improper rolling or welding.

Landing Edge.—The edge of a row of riveted plates which is covered by the lap.

Lanyard.—A rope put through dead eyes to tighten up a shroud.

Lap.[2]—A joint in which one part overlaps the other, thus avoiding the use of a butt strap.

Lap Joint. See **Riveted Joints.**

Lap Weld. See **Weld.**

Lashing.—Small ropes wrapped around larger ropes to hold them together, or to tie separate objects together.

Lattice Girder.—A girder having diagonal lattice members in place of a web plate.

Launching.—The operation of placing the hull in the water by having it slide down the **Launching Ways.** During launching the weight of the hull is borne by the **Sliding Ways,** which are attached to the hull and slide with it over the **Ground Ways.**

Launching Grease.—Melted Russian tallow of the best quality smeared over with soft soap and train oil to increase lubrication. Even with the best lubrication the launching ways often catch fire because of the great friction.

Launching Ways.—Heavy timbers fastened to the ground down which the boat slides in launching.

Laying off.—Using a template to mark plates, shapes, etc., for shearing, punching, etc.

Lay Up.—To strike the plate around a rivet hole after the hot rivet has been inserted to make the head of the rivet fit closely to the plate.

Lead.—The sounding weight used to determine the depth of water. Also used to denote a rope.

Lead Line.—The rope holding a lead during sounding.

Length. See **Lloyd's Length.**

Length between Perpendiculars.—The length of a ship measured from the forward perpendicular to the after perpendicular.

Length on Load Water Line. Same as **Length between Perpendiculars.**

Length Over All.—Extreme length from the foremost part of stem to extreme after part of hull.

Life Boats.[1]—Small boats stowed on the weather deck to use in case of a bad accident or sinking of the vessel.

Lift.—To make a template on the ship or in the yard to fit a special place. Also used to mean a rope extending from the top of a mast to the end of a yard.

Lift Pump. See **Pump.**

Light Load Lines.—The line to which a ship would sink with no cargo on board.

Light Screen.—A reflector to make lights shine in the direction desired and cut off light in other directions.

Light Shaft.—Vertical openings with glass covers to provide light to the compartments below.

Light Trim.—The draft fore and aft of a ship with no cargo on board.

Light Trunk.—A duct running from a lower deck to the weather duct to admit light below.

Lightening Holes.[2]—Holes in the floor plates of a cellular double bottom to lighten the weight, also called manholes.

Lights.

(*a*) **Mast Head Light.**—A white light carried on the foremast from 20 to 40 feet above the hull.

(*b*) **Port Light.**—A red light carried on the port side of the ship.

(*c*) **Range Lights.**—Two white lights, one aft of the masthead light and on a line parallel to the keel, thus showing the direction the ship is traveling.

(*d*) **Side Lights.**—Port light or starboard light.

(*e*) **Starboard Light.**—A green light carried on the starboard side of the ship.

(*f*) **Towing Lights.**—Two extra white lights, one above the other and not more than 6 feet apart to indicate that the ship has a tow.

Lignum Vitæ.[3]—A heavy hard wood sometimes used for bushing around pintles and tail shafts.

Limber Board.—The line of ceiling planking next to the keelson which is portable and used as a drainage for water.

Limber Chain.—A small chain through the limber holes which is pulled back and forth to keep holes free of grease and dirt.

Limber Hole.[2]—A hole of a few inches in diameter cut in a floor plate to allow water to drain through it near the bottom.

Liner.[2]—A flat or tapered strip placed under a plate or other part to bring it in line with another part which it overlaps.

Lines.—The plans of a ship that show its form. From the lines, drawn full size on the mold loft floor, are made templates of the various parts of the hull.

Lines (on a drawing).—Principal lines of a drawing are as follows:

Base Line.[1, 2, 4]—A horizontal reference line from which vertical measurements are taken.

Buttock Line.—A vertical line on the body plan parallel with the center line; a horizontal line in the half-breadth plan parallel to the center line; a curved line in the sheer plan.

Center Line.[1, 2, 4]—A vertical line in the center of the body plan perpendicular to the base line; a horizontal line in the half-breadth plan through the center of the ship.

Diagonals.—Lines running diagonally from center line to frame lines.

Frame Lines.—Outlines showing shape of frame of vessel.

Water Lines.—Horizontal lines parallel to the base line in the body plan; horizontal lines parallel to the base line in the sheer plan; curved lines in the half-breadth plan.

Lines (on a ship).—Wires, cords, or chalk lines from which measurements are taken.

Base Line.—A reference line for vertical measurements at right angles to vertical center lines.

Lines (on a ship)—*Continued*

Center Line.—A line through the center of the ship equally distant from sides, or a vertical line carried up through center of ship at right angles to base line.

Check Line.—An auxiliary reference line.

Grade Line.—A reference line established on a fixed slope or level.

Linesman.—The man who lays out the lines of a ship on a mold loft floor.

Lines Plan.—A drawing showing the general outline or form of the ship.

List.—The position of a ship when it is not level across, due to the cargo being more on one side than the other, or to a negative metacentric height.

Litosilo.—A megnesite composition or cement sometimes used as a substitute for wood on decks and sheathing.

Live Steam.—Steam direct from boilers which has not lost its expansive force.

Lloyd's.—An English society of underwriters who establish the classes of vessels and insure them. This society was formed in 1601. (See **American Bureau of Shipping.**)

Lloyd's Breadth.—The greatest molded width of the ship. (Denoted by *B.*)

Lloyd's Depth.—The distance from the top of the keel to the top of the beam at side of uppermost continuous deck measured at the middle of the length. (Denoted by *D.*)

Lloyd's Length.—Usually same as length between perpendiculars. (Denoted by L.)

Lloyd's Longitudinal Number.—$[L \times (B + D)]$. (See **Lloyd's Breadth, Length,** and **Depth.**)

Lloyd's Scantling Numbers. See **Lloyd's Transverse Number** and **Lloyd's Longitudinal Number.**

Lloyd's Transverse Number.—$(B + D)$. (See **Lloyd's Breadth** and **Depth.**)

Load Water Line.[1]—The line to which a vessel sinks when carrying its full load, usually painted on the side of the vessel.

Locking Hoop.—A collar in two pieces which fits around the top of a rudder shaft.

Locking Pin.—A steel pin for locking the loose quadrant to the keyed tiller.

Locking Pintle. See **Rudder Lock.**

Lock Washer.—A washer with projecting points which keeps the nut from working off a bolt.

Loftsman.—The man who lays out templates in the mold loft.

Log.—A device similar to a cyclometer or speedometer which is pulled along behind a ship to record number of miles traveled. Also used to mean the diary kept by the captain of a vessel.

Log Line.—A rope to hold the log behind a ship.

Longitudinal.[1]—A fore and aft vertical member running parallel, or nearly parallel, to the center vertical keel through the double bottom. In merchant ships longitudinals are intercostal. Also meaning in a length-wise direction.

ngitudinal Number. See **Lloyd's Longitudinal Number.**

ose Quadrant. See **Quadrant.**

ose Rivet. See **Rivet.**

uvre.—An opening in the side of a deck house with sloped pieces to keep water out and which serves to ventilate the compartment inside.

ig.—A short angle to fasten outstanding leg of another angle. (See **Clip.**)

igpad.—A projection on deck with hole for fastening a block for a lead.

M

achined Bolt.—A steel bolt which has been turned to exact size on a turning lathe.

achine Riveting. See **Riveting.**

achinery Casing.—A small deck house raised above the deck floor to house skylights, vents, etc., to engine room and prevent sea water from passing below.

agazine.—A compartment or room in which ammunition is stored.

agnasil. Same as **Litosilo.**

agnetic Oxide. Same as **Black Oxide.**

ain Deck.[1, 2, 3, 4]—The principal deck of the main hull, being the highest of, and giving strength to, the main hull.

Main Mast. See **Mast.**

Main Rail.[2]—Principal rail at top of bulwark.

Making Up.—The timbers which build up from the sliding way to the curved parts of the underside of ship.

Malleable.—Capable of being bent and welded without cracking.

Malleable Cast Iron.—Cast iron which is made malleable by annealing.

Manganese Steel. See **Steel.**

Manger.—A compartment extending athwartships just aft of the hawse pipe to collect water which might come up on the hawsers and allow it to drain to the sea.

Mangle.—A large machine roller for straightening plates.

Manhole.[2]—A round or oval shaped hole cut in a bulkhead, tank top, etc., large enough for a man to pass through. (See **Lightening Hole.**)

Margin Line.—A working line drawn three inches below the bulkhead deck in determining the spacing of bulkheads.

Margin Plank. Same as **Boundry Plank.**

Margin Plate.[2, 4]—The outer boundary of the inner bottom, connecting it to the shell plating at the bilge.

Marine Plumber. See **Pipe Fitter.**

Marker.—A brass pipe dipped in enamel for marking rivet holes on stock.

arking Hammer.—A tool for marking rivet holes on a template.

arlinspike.—A pointed, tapering metal tool for separating the strands of rope or cable in splicing.

artingale.—A small strut at right angles to bowsprit or jib-boom to stiffen it.

ast.[1]—A large long spar, placed nearly vertical on the center line of a ship. (See **Fore, Main** and **Mizzen Masts.**)

ast Cap.—A massive metal ring fitted around a mast to form splice with mast above.

ast Coat.—A canvas joint fitted to the mast and to the weather deck to make the mast hole waterproof.

ast Doubling.[1]—Extra plates riveted inside a steel mast to increase its strength.

ast, Fore.[1]—The first mast forward.

ast Holes.[1]—Openings in a deck to allow the mast to go through.

ast, Main.[1]—The second mast from the forward end of a ship.

ast, Mizzen.—The third mast from the forward end of a ship.

ast Partners.—Carlings around a mast hold.

ast Pedestal.—A structural framework similar to a mast tabernacle.

ast, Pole.—A main mast made in one piece throughout.

Mast Step.[1]—A structural framework over a tunnel top for the mast to rest on.

Mast Tabernacle.—A framework braced in four directions built on top of a deck to hold a mast where the mast cannot extend 'tween decks.

Mast, Top.—The upper section of the mast.

Mast Wedges.—Wooden wedges driven between a mast and the second deck to stiffen the mast.

McIntyre Tank.—Tanks between double bottoms where the dividing partitions do not completely fill vertical space between double bottoms, thus allowing access for inspection, etc.

Mean Draft.—Average of forward draft and after draft.

Mechanical Ventilation. See **Ventilation.**

Melting Heat. See **Heat.**

Merchant Ship.—A ship designed to carry cargo. A freight ship.

Messenger Chain.—A chain from the engines to drive the windlass.

Metacenter.—The point of intersection of vertical lines drawn through the center of buoyancy as the ship rolls from side to side.

Metacentric Height.—The vertical distance between the metacenter and the center of gravity of the ship.

Middle Body. Same as **Dead Flat.**

Middle Line Girder.[2]—A plate girder made up of the keel and keelson running the entire length of the vessel.

Midship.[2]—At the middle of the ship's length.

Midship Coefficient. See **Coefficient of Fineness.**

Midship Section.[2]—A plan showing a cross-section of the ship amidships. This plan shows sizes of frames, beams, brackets, etc., and thicknesses of plating. See **Body Plan.**

Mile. See **Nautical Mile** and **Statute Mile.**

Mill.—To plane the ends of a piece of steel exactly at right angles to the axis of the piece.

Milled Edge.—A plate whose edge has been rolled to exact proportions in the rolling mill.

Mill Scale. Same as **Black Oxide.**

Millwright.—The man who erects the structural shops.

Mirum. Same as **Litosilo**

Mixed Equilibrium.—A condition where the vessel would be in stable equilibrium if inclined one way and unstable equilibrium if inclined the other way.

Mizzen Mast. See **Mast.**

Model.—A miniature ship made to small scale from the lines plan.

Mold.—A light pattern of a part of a ship. Usually made of thin wood or paper. Also called a template. Also used to denote a form made of sand into which molten cast iron and cast steel are poured.

Mold Loft.—A shed or building with large, smooth floor on which the lines of a ship can be drawn to full scale.

Molded Dimensions.—The dimensions to outside of frames, etc., but not including the shell plating.

Moment.—The product of a force and its perpendicular distance to the origin of moments.

Moment of Inertia.—The sum of the products obtained by multiplying each mass of the framework of a vessel by the square of its distance to the neutral axis.

Monkey.—A mass of iron over each dog shore which can be released simultaneously to launch the ship by the cutting of a single cord.

Mooring.—Securing a ship in position by several lines or cables, so that she cannot move or swing.

Mooring Bitts. See **Bitts.**

Mooring Pipes.—An elliptical shaped hole through the bulwark protected by a rounded casting and used to pass hawsers through.

Mould.—Alternate spelling of **Mold.**

Mould Loft.—Alternate spelling of **Mold Loft.**

Mud Box.—A rectangular box having a perforated plate in it which is inserted between the valve chest and the pump line to serve as a sand trap. (See **Strainer.**)

Muntz Metal.—An alloy of about 3 parts copper and 2 parts zinc.

Mushroom Head. See **Rivet Head.**

Mushroom Ventilator. See **Ventilator.**

N

Natural Ventilation. See **Ventilation.**

Nautical Mile.—6080 feet, corresponding to one minute of longitude at the equator. (See **Knot.**)

Naval Brass.—Muntz metal with the addition of 1 per cent of tin. (See **Brass.**)

Net Tonnage.—The gross tonnage minus crew spaces, machinery spaces, coal bunkers, etc. The earning volume of a ship divided by 100. (See **Gross Tonnage.**)

Neutral Axis.—An imaginary plane at about half depth of ship in which structure is neither in tension nor compression when submitted to hogging or sagging stresses.

Neutral Equilibrium.—A condition such that if the vessel was inclined a small amount sideways it would keep the same position without tending to turn either way.

Nickel Steel. See **Steel.**

Non-return Valve.—A valve which allows water to accumulate in the well but will not let it run out; also used to drain the decks.

O

Oakum.—A poor grade of rope fiber used for the first layer in calking a joint in pipe.

Oil Tight.—Riveted and calked to prevent oil leakage. (Rivets must be more closely spaced for this purpose than for water tightness.)

Old Man.—A rig for holding a drill.

On Board.—On or in the ship.

On Deck.—On the upper deck, in the open air.

Open Bevel. See **Bevel.**

Open Hearth Steel. See **Steel.** See **Acid Process** and **Basic Process.**

Open Rail.—A bulwark composed only of pipe rails.

Orlop Deck.—A lower deck not extending the full length of the ship.

Outboard.—Away from the center line, towards the side of a ship.

Outboard Profile.—The " Side Elevation " of a vessel.

Outer Stay.—A rod extending from forward end of jib boom over the martingale and to bow of vessel.

Outreach.—The distance a derrick can reach beyond its base.

Overboard.—Outside, over the side of a ship. Into the water.

Overhang.—Portion of the hull over, and unsupported by the water.

Overhead Cable System.—A method of installing parts of a vessel from a traveling trolley which runs on a large steel cable vertically over the center line of the vessel and supported at each end by very large wooden or steel columns or masts. (See **Traveling Gantry.**)

Oxter Plate.[3]—The shell plate which connects to sternpost, usually of very sharp curvature or twisted and therefore cannot be developed

Oxy-acetylene Flame.—A very hot flame used for cutting steel made by mixing about 3 parts of oxygen to 2 parts of acetylene gas. Also used in different proportions for welding.

Oxy-acetylene Welding. See **Weld.**

P

Pad Eye.[3]—An eye located on deck for fastening cables.

Palm.—A guard for the hand used in sewing.

Pan Head. See **Rivet Head.**

Panhead Rivet. See **Rivet.**

Panting.—The bulging in and out of a ship's sides due to wave action. (See **Stresses.**)

Panting Stringer.[1]—Stringers reinforcing side plates against Panting Stresses.

Parallel Body. Same as **Dead Flat.**

Parrell.—A hoop running up and down the mast to support the upper topsail yard.

Partial Bulkhead. See **Bulkhead.**

Passer.—A man who passes rivets to the holder-on and sometimes puts them into the rivet holes.

Passing Tongs.—Tongs used in passing a rivet.

Pattern.—A wooden piece made exactly like the finished casting, with allowance for shrinkage, which is put into the mold and forms a cavity into which the cast iron or cast steel is poured.

Pay.—To run hot pitch over a joint after it has been calked. Also used to mean to "let out" ropes, etc.

Peak Tank. See **Trimming Tank.**

Percentage of Elongation.—The amount of stretch of a test specimen divided by its original length.

Period of Oscillation.—Time necessary for a ship to roll from one side to the other and back again.

Period of Waves. See **Waves.**

Permeability.—The degree to which water can be forced through any substance such as concrete. Also the percentage of a hold which could be filled with water if open to sea (gross volume minus cargo).

Phosphor Bronze. See **Bronze.**

Pickling.—To soak steel plates in dilute hydrochloric acid for one half hour to remove all rust and scale.

Pig Iron.—The product of a blast furnace which is run in the liquid state into "sows" and "pigs" like the branches of a tree.

Pillar.[1]—Vertical member or column giving support to a deck. Also called Stanchion. (See **Stanchion** and **Post.**)

Pillar Footing.[1, 2]—The connection of a pillar to the tank top or floor.

Pillar Head.[1, 2]—The connection of a pillar to the girders.

Pillar Ladders. See **Ladders.**

Pillars, Portable.—Removable pillars to facilitate loading and unloading the cargo.

Pillars, Tubular.—Pillars made of hollow pipes.

Pintle.[3]—Fitting or pin on the rudder which turns in a gudgeon.

Pipe Bender.—A ship plumber who specializes in bending pipes to fit the curves of the boat.

Pipe Davit. See **Davit.**

Pipe Fitter.—A ship plumber.

Piping. See **Flaws.**

Pitch.—The distance apart of rivets on the same line. Also the motion of a ship up and down in a fore and aft direction.

Pitting.—Formation of holes in steel plates by continuous corrosion.

Pivot.—To have a ship raise too fast on the stern during launching and pivot on the fore poppets or fore cradle, caused by launching when the water level is too high.

Pivoted Sidelight. See **Sidelight.**

Plan.[1]—The drawing of a horizontal section prepared for use in building a ship corresponding to "Floor Plan."

Planimeter.—An instrument which follows around the outline of a drawing and reads off its area.

Planing Machine.—A large machine for planing the edges of steel plates.

Planking.[2]—Wood covering for decks; also the horizontal wooden pieces on the outside of a vessel. (See **Decking.**)

Plate Bending Rolls.—Three large adjustable steel cylinders, two below and one above, used to bend or flatten plates, etc.

Plate Straightener.—A machine for flattening out buckled plates. See **Mangle.**

Platform.—A partial deck.

Plating.—The plates of the shell, a deck, a bulkhead, etc.

Plumb Bob. See **Engine Room Plumb Bob.**

Plummer Blocks.[1]—Large blocks of wood or structural supports inside the tunnel for holding the shaft in line.

Plying Hammer.—A form of hand-riveting hammer.

Pneumatic Riveter. See **Riveting.**

Pocket Bunkers. See **Bunkers.**

Pole Mast. See **Mast.**

ɔop.[1]—The after, upper portion of the hull extending aft of after perpendicular, usually containing the ɜteering gear.

ɔop Deck. See **Deck.**

ɔppet.—Vertical struts connecting the shell of the ship to the launching way at fore and after ends during launching.

ɔrt.[1]—The left-hand side of the ship when looking from aft forward. Also an opening in the side of the ship to admit light and air, or cargo, etc. (See **Cargo Port.**)

ɔrt, Blind.—A port with a steel door which looks like the shell plating when the port is closed.

ɔrt, Cargo.[1]—A door cut into the side of a vessel for loading and unloading cargo.

ɔrt, Freeing.[1]—An opening in the ship's side to allow water to run overboard.

ɔrtable Hatches.—One or two planks of ceiling planking bolted together, used in vessels having no double bottom to permit cleaning of bilges.

ɔrtable Pillars. See **Pillars.**

ɔrthole.[1]—A circular opening in the ship's side.

ɔunding Stresses.—The stresses caused in the framework of a vessel by the action of the waves. (See **Stresses.**)

ɾismatic Coefficient. See **Coefficient of Fineness.**

ɾofile. See **Outboard Profile** and **Inboard Profile.**

ɾomenade Deck. See **Deck.**

Proof Stress.—The load which a chain will hold and still be within its elastic limit, having a factor of safety of about two.

Propeller.[1, 3]—A revolving screw blade that drives the ship through the water, consisting of three or four blades, resembling in shape those of an electric fan.

Propeller Arch.[3]—The arched part of the hull just over the opening for the propeller.

Propeller Frame. See **Frame.**

Propeller Post.[3] Same as **Rudder Post.**

Propeller Shaft.[1]—A large cylindrical piece of steel which transmits the power from the engines to the propeller.

Protective Bars.[3]—Iron rods riveted over a sidelight to protect the glass.

Puddling.—The process of heating scrap iron or pig iron until it becomes a sticky, pasty mass but not to the melting-point, from which wrought iron is made.

Pumice.—A light-weight white powder mixed with fine gravel and used as an insulating material.

Pump, Ballast.—A large pump designed to fill or empty the ballast tanks.

Pump, Bilge.—A pump arranged to pump water out of the holds or bilges.

Pump Chamber.—An opening provided in the deck in which a deck pump may be inserted.

Pump, Deck.—A portable hand pump which can be inserted into a pump chamber and operated by hand.

Pump, Downton.—A suction pump operated by a flywheel which may be operated by steam or by hand.

Pump, Fire Engine.—A pump used only to pump water in case of a fire or to wash the decks.

Pump, Force.—A pump which not only lifts water out, but also forces it out through piping.

Pump, Lift.—A pump which only lifts the water, the water flowing from there by gravity.

Punch.—A machine for punching holes in plates and shapes.

Punch, Finder Point.—A rivet punch having a short cone-shaped point in the center of its face to fit into the punch mark in the plate.

Punching Machine.—A large yoke-shaped machine usually driven by electric power for punching rivet holes in steel plates.

Punch, Sloping Faced.—A rivet punch having its face not at right angles with its sides thus punching out one side first.

Punch, Spherical.—A rivet punch having a spherical-shaped projection on its face.

Punch, Spiral.—A rivet punch having a flat spiral on its face thus shearing the hole around its edge.

Q

Quadrant.—A casting in the shape of a segment of a circle to which the steering chains are attached and which moves the rudder head.

Quadrant, Loose.—A toothed casting fitted loosely into the rudder head and held to the keyed tiller by two springs to make it easier to keep the ship straight.

Quadruple Riveted Joint. See **Riveted Joints.**

Quarter Block.—A pulley over which the steering chain passes from the steering gear to the tiller.

Quarter Deck. See **Deck.**

Quarter Pillars.—A line of pillars about half way between the center line and the outside of the ship.

Quarter Sawed.—A piece of timber sawed on a line pointing to the center of the log.

Quarters.[1]—Compartments, rooms and other portions of the ship used for living spaces. Also a name sometimes applied to the side overhanging portion of the poop.

Quasi-arc Welding.—A process of welding by electric arc assisted by a flux which melts when the arc is formed making a fusible slag. (See **Welding.**)

Quay.—A bank formed on the side of a river or sea for loading and unloading vessels.

Quick Closing Gear.—A device for closing bulkhead doors quickly from the wheel house in case of bilging.

R

Rabbet.—A depression or offset designed to take some other adjoining part; as, for example, the rabbet in the stem to take the shell plating.

Racking Stresses.—Forces tending to distort the shape of a section through the vessel. (See **Stresses.**)

Radius of Gyration.—The square root of the moment of inertia of a figure divided by its area, used in designing pillars and struts.

Rafter.—Inclined member running from top to awning stanchion to support awning.

Rag.—The fin of metal sticking above the plate around a rivet hole or sheared edge.

Rail.[2]—The upper edge of the bulwarks.

Rail Stanchions.[2] Same as **Awning Stanchions.**

Raised Countersunk Head. See **Rivet Head.**

Raised Quarter Deck. See **Deck.**

Rake.—Amount of deviation from vertical, usually expressed per foot, as for masts, derricks, etc.

Rake Bunkers.[1]—A coal bunker where one side is sloped.

Rally.—A period of 4 or 5 minutes of continuous work before a rest.

Ram Bow.—A projecting underwater spur at the bow of battleships designed to ram other ships.

Ramming Chock. Same as **Collision Chock.**

Range of Stability.—The largest angle which a ship could be inclined from the vertical and still return to the vertical.

Reamer.—A slightly tapered drill with cutting edges which is inserted in a rivet hole to enlarge it or fair it up.

Reaming.—Enlarging a rivet hole by means of a revolving, cylindrical, slightly tapered tool with cutting edges.

Redlead.—An oxide of lead used in paints and in plumbing.

Redlead Injector.—A threaded hexagonal tool used to squeeze redlead between riveted plates.

Red Shortness.—Brittleness in a steel plate while hot, which makes it break off in ragged edges, due to the presence of too much sulphur and phosphorus. (See **Flaws.**)

Reducer.—A malleable cast-iron fitting for wrought-iron pipe which reduces the size of pipe from one size to another.

Refrigerating Machine.—A machine usually located 'tween decks for keeping refrigerators cold, operating by either the cold air, dry air, or ammonia system.

Relieving Tackle. See **Rudder Eye.**

Reserve Bunkers. See **Bunker.**

Reserve Buoyancy. See **Buoyancy.**

Reverse Frames.[2]—Pieces similar to the frames of a ship which are turned upside down and serve as the beams for riveting on the tank top; also riveted to the inner edge of a transverse frame to reinforce it.

Ribband.—A fore and aft wooden strip of heavy batten used to support the upper ends of the transverse frames temporarily after erection.

Ribs.[2] Same as **Frames.**

Rider Plate.—The foundation plate between a pillar and the center keelson.

Rigging.—Ropes, wire ropes, lashings, etc., used to support masts, spars, booms, etc. Also the handling and placing on board the ship of heavy weights, machinery, etc.

Righting Moment.—The number of foot pounds of moment tending to return a vessel to the vertical after being inclined sideways. (See **Moment** and **Stability.**)

Ring Bolt.—An eye bolt having a loose ring inside for lifting hatches, manholes, etc.

Ripping Punch.—A tool used on a punching machine for cutting a long slit or opening in a steel plate.

Rise of Bottom.[2] Same as **Rise of Floor** or **Deadrise.**

Rise of Floor.[2]—The height which the underside of a midship frame would attain if continued at the same slope from the keel to the full width of the ship. A measure of sharpness of the vessel's bottom. (See **Deadrise.**)

Rivet.—A short metal connection of two or more members usually driven or clinched after being heated red hot.

Rivet, Bat.—A rivet with a cone head.

Riveted Joint Efficiency.—A decimal obtained by dividing the strength of the riveted joint by the strength of the unriveted plate.

Riveted Joints:

Butt Joint.—A joint formed by butting the edges of the plates together and covering with one or two straps.

Chain Riveting.—Two lines of rivets directly opposite each other.

Double Riveted.[1]—Two lines of rivets.

Lap Joint.[2]—A joint formed by lapping one plate over the other without using any strap.

Quadruple Riveted.—Four lines of rivets.

Single Riveted.[1]—One line of rivets.

Staggered Riveting.—Two lines of rivets with spaces alternated.

Triple Riveted.[1]—Three lines of rivets.

Riveter, Hydraulic.—A large machine with U-shaped frame which drives rivets by water power.

Riveter, Pneumatic.—A compressed air hand tool for riveting.

Riveter, Steam.—A machine similar to a hydraulic riveter which drives rivets by steam power.

Rivet Heads:

Bat Head. Same as **Cone Head.**

Bull Head.—A snap head where the rivet was too long, having too much metal to form a perfect head.

Button. Same as **Snap Head.**

Cone.—A rivet head coming to a point like a cone.

Cup. Same as **Snap Head.**

Flattened.—A snap head hammered down.

Flush Countersunk.—A rivet head where the hole has been countersunk and the top of the driven rivet chipped off.

Full Countersunk.—Same as flush countersunk but not necessarily flush with the plate.

Hammer Point.—A round head, with cone-shaped point.

Mushroom Head. Same as **Splashed Head.**

Pan Head.—A flat-topped head with sloping shoulders.

Raised Countersunk.—A rivet head driven into a countersunk hole but still having considerable of the rivet extending above the riveted surface.

Snap.—A full or nearly semi-spherical head. (The most used type.)

Splashed.—A snap head flattened down.

Rivet Heads—*Continued*

Stud Head.—A countersunk rivet with a square projecting portion above its head allowing it to be turned with a wrench.

Tap Head.—A rivet with threads turned into its body.

Rivet, Loose.—A term applied to a rivet which was not driven tight and rattles when hit by a hammer.

Rivet Set.—A tool used in calking around a rivet.

Rivet Squad.—Usually consisting of four men, the rivet heater, the rivet catcher and inserter, the bucker up and the riveter.

Bucker Up.—The man who holds a dolly bar up against the head of a rivet while it is being riveted.

Holder On. Same as **Bucker Up.**

Rivet Catcher.—The man who catches the rivets in a tin can after they have been thrown by the rivet heater, and inserts them in the holes.

Riveter.—The man who forms the head on the rivet with a pneumatic hand riveter or otherwise.

Rivet Heater.—The man who heats the rivets in the salamander.

Riveting, Hand.—To make the head of a rivet by hand using a hammer or pneumatic riveter.

Riveting, Machine.—A term applied to any system of riveting other than hand or pneumatic riveting

oll.—Motion of the ship from side to side alternately raising and lowering each side of the deck. (See **Rolls.**)

olling Chocks.—Heavy blocks placed under engines, boilers, etc., to take up the thrust caused by the rolling and pitching of the ship.

olls, Cogging.—The rolls between the roughing rolls and the finishing rolls in a steel plate mill.

olls, Finishing.—The last rolls through which a plate is put before it comes out the finished section.

olls, Roughing.—The first few rolls through which a steel ingot is put in rolling.

ose Box. Same as **Strainer.**

ound Up. Same as **Camber.**

ubbing Piece. Same as **False Keel.**

udder.[1, 3]—A large, heavy fitting hinged to the rudder post. Used for steering the ship.

udder Arms.[3]—Heavy steel arms fastened to the rudder stock and the rudder plate to move the rudder plate and to stiffen it.

udder, Balanced.—A rudder pivoted on its center, the entire weight of which is carried from above instead of on the bottom pintle.

udder Bow.—An auxiliary rudder at the bow of a small boat for use when the boat is backing up.

udder, Center Plate.[3]—A rudder formed by riveting two frames on to a center plate to form a rudder.

Rudder, Contour of.[3]—The shape of the rudder plate.

Rudder Coupling.[3]—The connection between the rudder stock and the rudder.

Rudder Eye.[3]—An eye bolt attached to the top of the rudder so that in case all the steering apparatus breaks down, cables called relieving tackles may be attached to the rudder through this eye and led up over the sides of the ship to be operated by hand.

Rudder Head.[3]—The shaft running vertically from the rudder to the steering gear.

Rudder Lock.[3]—A pintle with a projecting collar on the bottom to prevent the rudder raising enough to unship it.

Rudder Plate.[3]—The vertical plate of a rudder.

Rudder Post.[3]—Heavy vertical post at after end of stern frame under water which supports rudder. (See **Propeller Post.**)

Rudder, Side Plate.—A rudder formed by riveting two side plates on to a framework to make the rudder.

Rudder, Single Plate.—A rudder composed of a single plate and connected to the rudder stock by rudder arms.

Rudder, Solid Plate.—A rudder where the plate and the arms are cast or forged in one piece.

Rudder Stock.[3]—The lower portion of the vertical shaft of a rudder.

Rudder Stop.[3]—Fitting to limit the swing of the rudder.

Rudder, Suez Canal.—A detachable plate which can be fastened to the rudder to give it more area and make the ship turn sharper.

Rudder Tell Tale.—A device connected to the rudder by lever arms which indicates to the man at the wheel the position of the rudder at all times.

Rudder Trunk.[3]—A small vertical compartment directly over the rudder to allow the rudder head to pass through.

Rungs.—The steps of a ladder.

S

Saddle.—An inverted V-shaped trunk or shaft through which coal is stowed and which helps to distribute the coal.

Sagging. See **Stresses.**

Sail Needle.—A heavy three-cornered needle used in making sails.

Salamander.—The small portable gas oven used for heating rivets.

Saloon.—The public reception room or parlor.

Sampson Post.—A heavy vertical post that supports cargo booms.

Sanitary Tank. See **Tank.**

Sawdust.—Often pressed into cakes and used as an insulating material.

Scantling *Numbers.* See **Lloyd's Scantling Numbers.**

Scantling Plan.—A drawing showing the dimensions of the various parts of a ship.

Scantlings.—The dimensions of various parts of the ship.

Scarf Weld. See **Weld.**

Scow.—A cargo vessel with no means of propulsion.

Scrap.—Waste pieces of steel, etc.

Screen Bulkhead. See **Bulkhead.**

Screw-down Valve.—A valve set into the bilge suction pipes which closes the pipe by screwing it down.

Scrive Boards.—A large section of flooring in the mold loft in which the lines of the body plan are cut with a scrive knife. Used for making molds of the frames, beams, floor plates, etc.

Scrive Knife.—A knife used to cut the lines (about $\frac{1}{16}$ in. wide and $\frac{1}{16}$ in. deep) into the scrive board.

Scullery.—The room adjacent to the galley where dishes, kettles, etc., are kept. Corresponding to "pantry."

Scupper Lip.—A projection of the scupper beyond the shell plating to prevent water running down the sides of the ship.

Scuppers.[2]—Holes cut through the bulwark to allow water to run overboard from the decks.

Scupper Shutters.—Small doors hinged outwards covering the scupper holes on the outside of a vessel.

Scuttle.—A small hole in a vessel's deck used as a hatchway.

ea Cock.—A pipe fitted with a non-return valve to allow water to escape from the ship and prevent sea water getting in.

eam.[1]—Fore and aft joint of shell plating.

eam Strap.—Butt strap of a seam.

easoning.—The gradual drying of timber for deck planks, etc., to prevent shrinkage or decay.

ection Modulus.—The moment of inertia of a figure divided by distance from its center of gravity to the extreme fiber, used in designing beams and girders.

ections. See **Shapes.**

egregation. See **Flaws.**

elf-stowing Anchor. See **Anchor.**

erve.—To wrap a hawser with smaller ropes.

erving Board.—A board used in the same way as serving mallet.

erving Mallet.—A tool used in serving or wrapping cord about a rope or cable.

et.—The permanent deflection left in a test specimen when stretched beyond its elastic limit. (See **Set Bar.**)

et Bar.—A soft iron bar which is made to the correct shape from the template and which is used to make final piece. Also called **Set.**

extant.—An instrument used at sea to measure the angle of elevation of the sun or the angle between objects on shore.

Shaft.[1, 3]—Long, round, heavy forging connecting engine and propeller.

Shaft Alley.[1, 3] Same as **Tunnel.**

Shaft Blocks. Same as **Plummer Blocks.** Sometimes called **Shaft Stools.**

Shaft Bracket.—A bracket under the shaft in a twin screw vessel.

Shaft Tube.[3]—The water tight thimble where the shaft extends through the shell plating. (See **Stern Tube.**)

Shaft Tunnel.[1, 3]—Enclosed alley-way around shaft extending from engine room to after peak tank, through which propeller shaft runs.

Shape.—Long bar of constant cross-section, such as a channel, T-bar, angle bar, beam, girder, H-column, bulb section, etc.

Shear.—The difference between the sum of all upward and downward forces acting on any section of a vessel. (See **Stresses.**)

Shear, Double.—To cut the body of a rivet off in two planes.

Shear, Single. To cut the body of a rivet off in one plane as by shears.

Sheared Edge.—The edge of a plate after a piece has been cut off in the shearing machine.

Shearing Machine.—A large machine for cutting steel plates by an action similar to scissors.

Shears.—Large machine for cutting plates and shapes.

Sheathing.—A copper or zinc coating on the outside of a vessel to prevent fouling.

Sheave Block.—A portable pulley of one, two, or more sheaves.

Sheaves. The grooved wheels inside a sheave block over which the ropes pass.

Sheer.—The slope of a deck fore and aft.

Sheer Draft. Same as **Sheer Plan.**

Sheer Drawing.—A drawing of the side of a vessel showing the water lines, buttock lines, etc.; also called **Sheer Plan.**

Sheer Plan. See **Sheer Drawing.**

Sheer Strake.[2]—The upper strake of the main shell plating, just below the bulwarks, following the sheer of the deck. (See **Sheer**; see **Strake.**)

Sheering of Shell Landings.—To line in the shell plating and mark its intersection on the frames.

Sheet Anchor. See **Anchor.**

Shell Expansion. See **Expansion Plan of Shell.**

Shell Landings.—Points on the frames showing where the edges of shell plates come.

Shell Packing. Same as **Frame Liners.**

Shell Plating.[2]—The steel plates riveted to the outside of the frames to form the outside of the ship.

Shelter Deck. See **Deck.**

Shelter Deck Ship.—A ship where there are one or more permanent openings or hatches left in the upper continuous deck, so that waves might wash into space between upper and second decks.

Shift.—To change position transversely on a ship.

Shifting Board.—A fore and aft center line partition of portable boards to prevent bulk grain from shifting sideways.

Shift of Butts.—To stagger the joints in shell plating so that they do not occur vertically over each other.

Ship.—A large vessel, either passenger or cargo. (See **Boat.**)

Ship Curves.—A set of a large number of French curves used in drawing the curved lines of a ship in the drafting room.

Ship Shaped.—Having pointed ends like a ship.

Ship Water.—To take water on board.

Shipwright.—A ship carpenter.

Shoe Plates.—U-shaped plates fitted around the keel to take up wear and impact and thus protect the keel.

Shores.—Horizontal struts between furring pieces to hold same in place. Also used to denote vertical wooden struts used as temporary supports for beams or floors.

Shoulder.—The projection made on a plate in calking.

Shoveling Flat.—The bottom of a coal bunker where it is made flat for shoveling coal.

ırouds.—A set of ropes extending from the mast head to the sides of the vessel to support the masts.

ıutter.—A hinged steel, waterproof doorway over a hatchway

de Bar Keel. See **Keel.**

de Bunker Bulkhead. See **Bulkhead.**

de Bunkers.—Coal bunkers placed at the sides of battleships as a protection for the ship.

de Edge.—The edge of a row of riveted plates which can be seen on the outside.

de Keelson. See **Keelson.**

idelight.[3]—A metal frame riveted in the shell of a vessel and carrying heavy glass to illuminate the inside.

idelight Cover.—A galvanized iron cover with rubber bearing which is bolted over a sidelight to protect it.

delight, Pivoted.—A side light mounted on a vertical axis which swings outward and acts as a wind catcher for ventilating the holds or cabins.

de Lights. See **Lights.**

idelight, Ventilating.—A Sidelight arranged to admit fresh air for ventilating.

de Plate Rudder. See **Rudder.**

de Scuttle.—Sometimes used to mean sidelight. (See **Scuttle.**)

de Stringers.[2]—Plate girders with their webs laying horizontally which frame in between the web frames to stiffen them.

Side Tanks. See **Double Sides.**

Sighting.—The process of lining up the frames or outside shell of a ship to "fair" it in during erection, or to determine whether ship has been damaged in dry dock.

Silicate Cotton.—A mixture of cotton and silicate used as an insulating material in ice boxes and in funnel casings.

Sill Plate.—The protecting threshold over the opening in the bottom of a door in a bulkhead.

Single Plate Rudder. See **Rudder.**

Single Riveted Joint. See **Riveted Joints.**

Single Shear. See **Shear.**

Skeleton Floor.—A floor system formed by omitting every second or third floor.

Skylight.[1]—An opening in a deck to give light and air to the compartments below it.

Slag.—The material which floats on top of a blast furnace caused by the flux uniting with the impurities.

Slagwood. Same as **Silicate Cotton.**

Slash Grain.—A piece of timber sawed tangent to the annual rings.

Sliding Ways.—Heavy timbers fastened to the ship which slide over the ground ways in launching. Sometimes called bilge logs.

Sling.—A rope attachment for carrying loads from the outside on board a ship in the overhead cable

ling Chain.—A chain passing through an eye plate in the mast and holding up the sling hoop of a yard, also the chain supporting the sling in the overhead cable system.

ing Hoop.—A fitting around a yard where it is fastened to the mast.

ing Load.—The load carried in a sling.

ip.—The difference between the speed of the propeller and the forward motion in the water. (See **Slipway.**)

ipway.—The berth in which a vessel is built.

oping Faced Punch. See **Punch.**

ug.—The punching which comes out of a plate when a rivet hole is punched in it.

noke Stack.[1]—Large, vertical pipe or funnel for exit of smoke from boilers.

ıap Head. See **Rivet Head.**

)ft Packing.—An oily or tarry material placed under a rivet head to make it watertight without calking.

)il Pipe.—A drainage pipe leading from toilets, sinks, etc., to storm valve.

)lder.—A piece of lead used in soldering a joint.

)ldering.—To unite two pieces of lead or other materials by heating them and pouring molten lead between them.

)le Piece.[3]—The bottom connection of a stern frame.

)le Plate.—A heavy sheet of steel placed under engine seat.

Solid Plate Rudder. See **Rudder.**

Sounding.—To determine the depth of water by dropping a sounding weight. (See **Lead.**)

Sounding Pipe.—Vertical pipe in oil or water tank used to measure depth of liquid in tank; also called sounding tube.

Soundness.—Absence of blow holes in steel castings, etc. (See **Flaws.**)

Spar.—A long, round piece of wood.

Spar Ceiling. Same as **Cargo Battens.**

Spar Deck.—Upper deck.

Spar Deck Ship.—A three deck ship in which the frames between the second deck and the upper deck are made somewhat lighter and the upper deck is also of lighter construction. (See **Full Scantling Ship.**)

Spare Anchor. See **Anchor.**

Spare Tail Shaft.—An extra tail shaft stowed in the stuffing box recess for emergencies.

Spherical Punch. See **Punch.**

Spilling.—Figures painted on the edge of a template to indicate how far out the edge of the plate should be (only used where the template is too small).

Spiral Punch. See **Punch.**

Splashed Head. See **Rivet Head.**

Splice Piece. See **Bosom Piece.**

Spline. Same as **Battens** for drawing curves.

Spontaneous Combustion.—The catching fire of coal or other stores in a hold or bunker due to heating.

Spread.—Distance at right angles to the center line.

Spring Buffer.—A coiled spring shock absorber inserted in the steering chain to take up the impact when a wave hits the rudder suddenly.

Spur Shore.—A slanting brace on either side of ship or ways.

Squeezer.—A bar having a curved projection at the bottom which is used on a bending slab to squeeze over the piece to be bent.

Stability.—Tendency of a ship to remain upright.

Stable Equilibrium.—A condition, such that if the vessel was inclined a small amount sideways it would tend to return to the upright position.

Staging.—Timber platforms built up around a ship during erection.

Stage Planks.—Timbers making up the floor of a way and upon which the grounds ways are laid.

Stage Poles.—The vertical members of a staging at the side of a vessel in dry dock or in the ways.

Staggered Riveting. See **Riveted Joints.**

Stamp.—A tool used in a hydraulic press to give shape to a fitting by pressing it with tremendous force.

Stanchion.[1, 2]—A post or support, as an awning stanchion, or a rail stanchion. Also applied to supports under deck beams, which in structural work, would be called " columns " or pillars.

Standing Way. Same as **Launching Way.**

Stapling.—Collars, forged of angle bars, to fit around continuous members passing through bulkheads, for water tightness. (See **Collars.**)

Starboard.[1]—The right-hand side of the ship when looking from aft forward. Opposite to port.

Starting Ram. See **Hydraulic Ram.**

State Rooms.—Private sleeping rooms for the passengers.

Stations.—Equal divisions in the length of a ship for spacing the frames.

Statute Mile.—5280 feet.

Stay.[2]—A strut between vertical walls to stiffen them. Often used in coal bunkers. Also used to mean a rope connecting the top of a mast to the deck. Longitudinal stays are called "fore and aft" stays; tranverse stays are called "back stays."

Steadiness.—Lack of extreme rolling in a vessel, produced by making the metacentric height small.

Stealer.—A strake which is widened out to occupy the space left by discontinuing; a drop strake.

Steam Riveter. See **Riveting.**

Steamship.—A large vessel driven by steam.

Steam Tiller.—A device similar to a telemotor, operated by steam.

Steel.—Iron cast from the molten state into a mass which contains a small percentage of carbon and usually some other chemical to give it particular properties and which is malleable.

Steel—*Continued*

Bessemer Steel.—Steel produced in a Bessemer converter.

Chrome Steel.—Steel containing from 1.5 to 2.5 per cent chromium, having very high elastic limit and withstanding shocks very well. Used for armor plate, tools, gears, vaults, etc.

Electric Steel.—Steel made in an electric furnace.

Manganese Steel.—Steel containing from 11 to 14 per cent of manganese; so hard that no other steel will cut it. Used for steel castings, machinery, vaults, etc.

Nickel Steel.—Steel containing from 2.25 to 4.5 per cent of nickel; very strong, hard and tough, and having low coefficient of expansion. Used for armor plate, steel castings, shaftings, etc.

Open Hearth Steel.—Steel produced in an open hearth furnace.

Tungsten Steel.—Steel containing from 3 to 10 per cent of tungsten, having remarkable hardness. Used in "high-speed" tools because it does not lose its temper at high speeds. Retains magnetism better than any other steel.

Vanadium Steel.—Steel containing from 0.1 to 0.15 per cent vanadium, being very strong, tough and stands impact well. Eliminates blow holes or air bubbles. Used in castings, forgings, machines, shafting, gears, etc.

Steel Castings.—Pieces of steel which are cast into their final forms in a mold similar to cast iron, using *molten* steel.

Steel Saw. See **Friction Saw.**

Steel Wire Brush.—A hand brush with steel wire fibers used to scrape rust and paint off steel plates.

Steering Chain.—A chain connecting the stearing gear to the tiller.

Steering Gear.—Apparatus for controlling the rudder.

Steering Gear, Electric Hydraulic.—A patent system of rudder control by electric motors and oil cylinders.

Stem.[1]—Forging or casting, forming extreme bow of ship, extending from keel to forecastle deck. (See **Cut Water.**)

Stem Bow.[1] Same as **Stem.**

Stepped Bulkhead. See **Bulkhead.**

Stern.[1]—After end of ship.

Stern Expansion.—To develop or lay out on a flat plate the exact shape which will fit the stern when beveled, or rolled to the correct angle.

Stern Frame.[3]—Large casting attached to after end of keel to form ship's stern, to which shell plating strakes are fastened. Includes rudder post, propeller post, and aperture for propeller.

Stern Tube.[3]—Metal tube through stern frame, through which propeller shaft passes. (See **Shaft Tube.**)

Stiffener.[4]—An angle bar, T-bar, channel, etc., used to stiffen plating of a bulkhead, etc.

Stiffeners of a Girder.[2]—The vertical angles riveted to web plate to resist buckling and shear.

Stiffness.—The property of a vessel making it difficult to incline by external forces, produced by making the metacentric height large.

Stock.—The name applied to steel plates, etc., before they are laid out and cut, etc.

Stoke.—To tend the fires in a boiler.

Stokehold.[1]—Space in front of boilers in hold through which the furnaces are stoked.

Stopper Snug.[3]—A fitting to limit the swing of a rudder. (See **Rudder Stop.**)

Stops, Rudder.[3]—Projections on the side of a rudder stock to prevent the rudder swinging too far sideways.

Stop Water.—A layer of felt put in between two pieces of steel and filled with redlead to make the joint water tight.

Store Room Lining. See **Cabin Lining.**

Stowage.—Space for storing cargo, supplies, etc., as anchor stowage, etc.

Strainer.—The protecting strainer over end of bilge suction pipe.

Strake.[2]—A fore and aft course, or row of shell or other plating.

Strake Book.—A small book having listed in it the ordered dimensions and mark of each shell plate.

Strake, Closing.[1]—A line of plates in which both edges fit over other plates.

Strake, Drop.—A strake which is discontinued because of the narrowing of the ship and is replaced by a stealer.

Strake, Garboard.[2]—The strake of shell plating next to the keel.

Strakes, Covering.—Narrow plates used to cover the butt joints of steel plates in the edge to edge system.

Strap.—An extra plate put over a butt joint in riveting to transmit the load from one plate to the other. (See **Riveted Joints.**)

Stream Anchor. See **Anchor.**

Stresses:

Bending.—A force trying to bend a beam, causing tension on one side and compression on the other.

Buckling.—A force trying to make a column bow out in the center.

Combined.—Any two or more stresses acting at the same time on the same piece.

Compression.—A stress trying to squeeze a short piece together.

Hogging.—The stress caused in a ship when the crest of a wave is amidships and the ends overhang.

Panting.—The stress caused in a ship by waves beating against its sides giving them an in and out motion.

Stresses—*Continued*

Pounding.—The stress caused in the framework of a vessel by the action of the waves.

Racking.—Forces tending to distort the shape of a section through the vessel.

Sagging.—The stress caused in a ship when the hollow of a wave is amidships and the ends are supported by the crests.

Shear.—A stress trying to cut a piece off on one or more planes similar to the action of shears.

Tension.—A stress trying to pull a piece apart parallel to its axis.

Torsion.—A twisting force applied at one end of a shaft and transmitted to the other end.

Strike.—To lower a topmast.

Stringer.[2]—A fore and aft continuous member used to give longitudinal strength. According to location are called mold stringers, bilge stringers, side stringers, etc.

Strong Back.—A short, heavy beam used as a brace against which bolts are screwed up to straighten or fair bent plates in the shell of a vessel.

Strong Beams.—Deck or hold beams built up of several pieces of structural shapes to increase their strength.

Strum Box. Same as **Strainer.**

Strut.—Support for propeller tail-end shaft used on ships with more than one propeller. (See **Strut.**)

Stud.—A short piece of iron fitted in the short diameter of a link of a chain to increase its strength.

Stud Head. See **Rivet Head.**

Stud Link.—An elliptical-shaped link in a chain having a short stud fitted between its sides to keep it apart.

Stuffing Box Bulkhead.[3] See **Bulkhead.**

Stuffing Box Recess.[3]—A compartment around the tail shaft to hold water which might leak in through the stern tube thus serving also to keep the bearings cool.

Suez Canal Rudder. See **Rudder.**

Summer Tank.—An extra oil tank in an oil-carrying ship which is put above the second deck extending along the sides and used when the oil carried is not dense enough to bring the vessel down to her load water line. May also be used for gasoline.

Surface Ventilation. See **Ventilation.**

Survey.—Inspection by Lloyd's or others.

Swan-neck Ventilation.[2] See **Ventilator.**

Sweating.—The condensation of moisture inside holds, etc.

Swash Plate.—A name sometimes applied to a wash plate.

Symbols. See **Abbreviations.**

Synchronize.—To have the period of roll of the ship the same as the time between waves, thus causing the boat to roll and pitch much more.

Syphon Trap.—A joint in a pipe which is always kept full of water, thus preventing gas going back up the pipe.

T

Tack.—To change course of ships by moving rudder.

Tack Rivet.—A rivet driven to hold pieces together temporarily while the finished riveting is being done.

Tail Pipe.—The pipe leading to a pump.

Tail Shaft.[3]—The aftermost length of the shaft. The piece which connects the shaft to the propeller.

Tank, Daily Supply.—A large tank of fresh water placed on top of the machinery casing to furnish drinking water, etc.

Tank Margin, Brackets.[2]—Brackets connecting the margin plate at the edge of a tank top to the frames.

Tank, Sanitary.—A large tank on top of the machinery casing to furnish salt water for baths and water closets.

Tank Top.[1, 2, 4]—The inner bottom forming the top of the ballast tanks.

Tap Bolt.—A bolt threaded all the way up to its head.

Tap Head. See **Rivet Head.**

Tapered Liner.[2]—A tapered metal filler strip placed under outside plates in the clinker system.

Tee.—A malleable cast-iron fitting for wrought-iron pipe, making two right angle turns in opposite directions.

Tee-bar Clip.—A short clip of tee-bar section.

Telemotor.—A device for operating the steering gear by water pressure run from the tiller to the bridge through ½ inch copper pipes.

Tell-tale Pipe.—A small pipe leading from the ballast tanks into the engine room so that the engineer can tell by opening a valve in them when the tanks are full.

Temper.—To draw the hardness out of steel by heating it to a temperature above low yellow critical temperature and allowing to cool slowly.

Temperature Stress.—The stress caused in a piece of steel due to a raise in temperature if the ends are fixed.

Template.—A mold or pattern used to lay out plates, etc.

Tensile Test Piece.—A specimen of steel one inch in diameter and eight inches long turned down on a lathe to be pulled apart in tension.

Tension. See **Stresses.**

Testing Machine.—A machine for pulling steel test pieces in tension. May also be used for other kinds of tests.

Thermit Welding. See **Weld.**

Thermometer Tubes.—Metal pipes extending into coal bunkers through which a thermometer may be lowered to determine if the coal is heating as stowed.

Thermo-tank System of Ventilation. See **Ventilation.**

Thrust Block.[1]—A device to take up the thrust from the propellers and transmit it to the framework of the ship without allowing it to push against the engines.

Thrust Block Recess.[1]—A compartment in the bulkhead just aft of the engine room to receive the thrust block.

Thrust Block Seat.[1]—A heavy structural framework connecting the framework of the ship to the thrust block.

Thwart.—Horizontal cross timbers in a staging. Also meaning across.

Tie Plank.—The fastening holding the ship from sliding down the ways.

Tie Plate.—A single fore and aft course of plating attached to deck beams under wood deck to give extra strength.

Tiller.—A movable arm connecting the steering chain to the rudder head.

Tiller, Keyed.—A Tiller keyed into the rudder head.

Timber Head. Same as **Bollard.**

Tipping.—The raising of the bow of a ship up in the air as the stern hits the water in launching caused by not having enough slope to the ground ways at the breast.

Toggles.[2]—Wood timbers around which rope is knotted or fastened.

Tom. Same as **Shore.**

Tomahawk.—A tool used in finishing a rivet.

Tongue Weld. See **Weld.**

Ton Measure.—100 cubic feet. (Used in estimating the capacity of a ship.)

Tonnage.—An index or measure of a vessel's interior volume. (See **Gross Tonnage** and **Net Tonnage.**)

Tons.—2240 pounds (in displacements, etc.); 2000 pounds (in steel, etc.)

Tons per Inch Immersion Curve.—A curve showing how many tons would sink the vessel one inch at all different drafts.

Top Mast. See **Mast.**

Topside Strake.[2]—The strake in the shell plating next above the main deck.

Topside Tanks. Same as **Gunwale Tanks.**

Torpedo.—A steel plug forced through a pipe to expand lead tubing for lining.

Torsion. See **Stresses.**

Tow.—Any kind of a vessel being towed by another vessel.

Transom.—Last main frame of ship attached to the stern framework.

Transom Beam.—A beam across a transom frame.

Transverse.—Athwartships, at right angles to the keel.

Transverse Frames.[1]—Vertical athwartship members forming the ship's "ribs." Sometimes called main frames. (See **Frames.**)

Transverse Number. See **Lloyd's Transverse Number.**

Trap. See **Syphon Trap.**

Traveling Crane.—A horizontal girder on tracks which travels up and down the shop and across the shop for lifting heavy loads.

Traveling Gantry.—A traveling crane about 100 feet high and 100 feet wide, which strides the hull and travels fore and aft on permanent lines of rails.

Treenails.—Cylindrical pegs of hard wood from 1 to 1½ inches in diameter.

Trestle Tree.—A tee-shaped fitting to a topgallant mast to hold yard arms, etc.

Trim.—Amount ship is off from an even keel. Also meaning to level off a pile of coal by hand after it falls in a pile.

Trimmers.—Men who go into a coal bunker to level off or trim the pile of coal.

Trimming Tanks.—Similar to deep tanks except placed at bow called fore peak tank or at stern called after peak tank to permit changing trim to secure an even keel.

Triple Riveted Joint. See **Riveted Joints.**

Tripping.—The tripping over sideways of a number of adjacent floors between inner and outer bottom of a vessel.

Trochoidal Wave.—The mathematical curve which is most like the shape of a wave of water.

Trunk. See **Expansion Trunk** and **Air Trunk.**

Truss Bow.—An adjustable metal fitting for connecting yards or cross arms to mast.

Truss Hoop.—A semicircular fitting to hold a truss bow to the mast.

Tube. See **Stern Tube.**

Tubular Pillars. See **Pillars.**

Tuck.—The after part of the bottom of a ship, where the sides converge.

Tuck Plate.—A separate plate bent to fit the sides of the hull above the propeller arch.

Tumble Home.[2]—An inboard sloping of the ship's side above the level of greatest beam.

Tungsten Steel. See **Steel.**

Tunnel Stools.[1]—Same as **Plummer Blocks.**

Tunnel Well.[1]—A well in the double floor under the tunnel to collect any water which might leak into the tunnel.

Turnbuckle.—A fitting with threads inside being threaded in opposite direction at opposite ends which would tighten up a rod upon being screwed up.

Turned Knee. See **Knee.**

Turret.—A circular inclosure in which guns are mounted.

Twin Screw.—Having two propellers.

U

Ultimate Load. See **Breaking Load.**

Unfair Holes.—Rivet holes which do not line up on being fitted together.

Unship.—To become detached from the ship.

Unstable Equilibrium.—A condition such that if the vessel were inclined a small amount sideways it would tend to depart still farther from the upright position.

Upper Deck.[1, 2, 3, 4]—See **Deck.**

Upset.—To drive a piece of steel back while hot, thus making it larger diameter.

Uptake[2].—The breeching in the smoke flue which connects the boilers to the funnel.

Uptake Ventilators. See **Ventilator.**

V

Valve Chest.—A rectangular box over the bilge suction pipes to equalize the pressure in the different lines.

Valves, Automatic Float.—A pipe with top bent over and containing a ball of light material such as cork or rubber, thus always admitting air but keeping out water.

Vanadium Steel. See **Steel.**

Vang.—A rope fastened to the outer end of derricks, etc., to hold them in position during loading or unloading.

Ventilating Bollard. See **Bollard.**

Ventilating Shaft.—An opening from the weather deck to a lower compartment to furnish fresh air.

Ventilating Sidelight. See **Sidelight.**

Ventilating Trunk.—The space between two frames closed up by a plate to form a continuous pipe for ventilation.

Ventilation.—The proper supply of fresh air to all parts of the ship.

Ventilation, Funnel.—A system of placing the ventilating ducts in the funnel, thus utilizing the heating power of the waste gases to cause an upward draft.

Ventilation Inlet.—An opening to admit air for ventilation.

Ventilation, Mechanical.—A means of supplying fresh air to all parts of a ship by circulation induced by fans, blowers or air blast rather than natural ventilation.

Ventilation, Natural.—A means of supplying fresh air to all parts of the ship by the natural tendency of hot air to rise or by the wind blowing past the ship.

Ventilation Outlet.—An opening to exhaust foul air.

Ventilation, Surface.—Pumping fresh air in above a cargo of coal to remove gases without forcing air through cargo.

Ventilation, Thermo-tank System.—A system of ventilating where the air is heated before being pumped through the pipes, thus serving as a ventilating and heating system combined.

Ventilator.[1]—A device for furnishing fresh air to compartments below decks.

Ventilator Coaming.—The vertical plate at the edge of an opening for a ventilating duct.

Ventilator, Cowl.[1]—A large funnel shaped ventilator usually having a vane behind it so that the opening will always be toward the wind, used to ventilate the holds.

Ventilator, Exhaust.—A small pipe in the side of a deck house having a cone-shaped opening forward thus causing a draft of air through the pipe to ventilate the deck house.

Ventilator, Goose-neck.[2]—A ventilating pipe with its upper end turned down 180° and facing fore and aft.

Ventilator, Mushroom.—An opening in a deck having a mushroom-shaped hood over it which can be screwed down from the inside and which serves to allow the escape of hot air which collects under it.

Ventilator, Swan-neck. Same as **Goose-neck Ventilator.**

Ventilator, Up-take.—Similar to a cowl ventilator except having a cone-shaped opening in the top which causes the air to blow through it, thus causing the air to move up instead of down.

Vents. See **Flaws.**

Vertical Curve.—The slope given to the ground ways in launching, usually a parabola, to insure more speed as the ship hits the water.

Vertical Keel. See **Keel.**

Vessel.—Any structure made to float on the water, large or small.

Vibration.—The shaking of a ship due to the motion of the engines.

Voice Tube.—Large speaking tube.

V. Weld. See **Weld.**

W

Wake.—The water just behind a vessel which has a forward motion due to the motion of the vessel.

Warp.—To shrink more on one side than the other thus making the piece not flat.

Wash Bulkhead. See **Bulkhead.**

Wash Girder.—A deep girder designed to prevent the splashing of oil or water in a tank.

Wash Plate.[4]—Vertical plates between the inner and outer bottom of a ship to prevent splashing of water in the tanks. Also used to mean the plate at the stern of a ship where the water washes around from the sides.

Wash Port.—An opening in a bulwark to allow water to wash overboard, usually protected by bars.

Water Ballast.—Water carried in the hold or tanks of a ship to make it sink far enough into the water to be safe at sea.

Water Course. See **Limber Holes.**

Water Line.—The line of the water's edge when the ship is afloat.

Water Logged.—A piece of timber which has absorbed so much water that it is heavier than water.

Water Plane Coefficient. See **Coefficient of Fineness.**

Watertight.—So riveted or calked as to prevent the passage of water.

Watertight Pitch.—4½ diameters of rivets in ordinary cases.

Waterway.—A narrow passage along the edge of the deck for the drainage of the deck. Same as gutter.

Wave. See **Trochoidal Wave.**

Waves, Period of.—The time between the passing from the crest of one wave to the crest of the next one.

Ways.—Supports for ship at time of launching.

(*a*) **Ground Ways.** Stationary timbers.

(*b*) **Sliding Ways.**—Timbers moving with the ship sliding over the ground ways.

Weather Deck.—Uppermost deck, running length of ship, having no overhead protection.

Web.[2]—The vertical portion of a beam, the thwartship portion of a frame, etc.

Web Frames.[2]—Large frames built of plates, used as stiffeners. Sometimes called "deep frames."

Web-frame System.[2]—A method of providing strength in the frame of a ship by increasing the size of every sixth frame; used particularly in vessels carrying oil in bulk.

Web of a Girder.[2]—The vertical plate at the center of a girder which carries shear.

Weld.—To unite two pieces of metal by forging them together, and fusing metal in between them.

Butt Weld.—To weld two pieces together by cutting the end of each piece square and butting them together.

Electric Welding.—A process of welding where the positive current is attached to one piece and the negative current to the other piece and the weld being made by heat caused by the electric arc.

Lap Weld. Same as **Scarf Weld.**

Oxy-acetylene Welding.—A process of welding using oxygen and acetylene gas. (See **Oxy-acetylene Flame.**)

Scarf Weld.—To weld two pieces together by cutting each on an angle and lapping them over.

Thermit Welding.—A process of welding, using powdered aluminum, iron filings, etc., which is lighted by a match and welds in about two minutes.

Tongue Weld. Same as **Scarf Weld.**

V. Weld.—To weld two pieces together in the shape of a letter V.

Welin Davit. See **Davit.**

Well Deck Steamer.—A ship with forecastle, bridge and poop decks, leaving spaces between each, thus not forming a continuous deck.

Wells in Double Bottoms.[1]—A space between two watertight bulkheads athwartship designed to accumulate the water which might leak in and flow in bilge gutter.

Whaleback.—A vessel with rounded gunwales looking like a whale and having all engines, bridges, etc. in its after part.

Whip.—A single rope lead through a block, also used to mean to seize a rope to prevent it raveling out at the end.

Whipping Line. Same as **Hoisting Line.**

White Heat. See **Heat.**

White Metal.—A zinc alloy poured into the gudgeons around the pintles to prevent side motion of rudder.

Wild Cat. Same as **Cable Wheel.** A large casting similar to a chain stopper.

Winch.[1]—A horizontal barrel turned by a crank or separate engine on which the hoisting lines of the derrick are wound.

Winch Doubling.—An extra plate of steel laid on top of the other plates to serve as a foundation for the winch.

Winch End.—An extra drum outside the bearing of a winch.

Winch Sole. Same as **Winch Doubling.**

Wind Catcher.—A casting with an opening forward which is inserted into a sidelight to catch the wind and force it through the hold or cabins, for ventilation.

Windlass.—The machine used to hoist the anchors.

Windlass Hand Brake.—A hand brake on the drum of a windlass to control its speed.

Windsail.—A hole in a canvas sail connected to a canvas pipe which leads the air below for ventilation.

Wing Boards.—Boards built at an angle extending down from a hatch in a coal bunker to prevent the coal from shifting into these corners (which might give the ship a dangerous list).

Wing Space.—Compartments at the sides of a ship which could be used for water stowage or coal bunkers.

Wiped Joint.—A joint made in lead pipe by wiping a joint with cloth and molten lead.

Wood Sheathing.—A name applied to wooden decking when laid on top of steel plating.

Working Stress.—The stress per square inch existing in a material when holding its load.

Wriggle.[3]—An L-shaped piece of iron riveted above a sidelight to keep water, which might run down the side of the vessel, from entering the sidelight. (See **Eyebrow.**)

Wrought Iron.—The product obtained by "puddling" scrap iron or pig iron to a pasty state, squeezing out the slag and rolling it. (See **Puddling.**)

Y

Yard.—A horizontal, thwartship spar fitted to a mast.

Yoke.—A horizontal piece fastened across the top of a rudder head, to the ends of which ropes are fastened to steer the vessel.

Z

Z Frames.—Frames of a ship made of Z sections.

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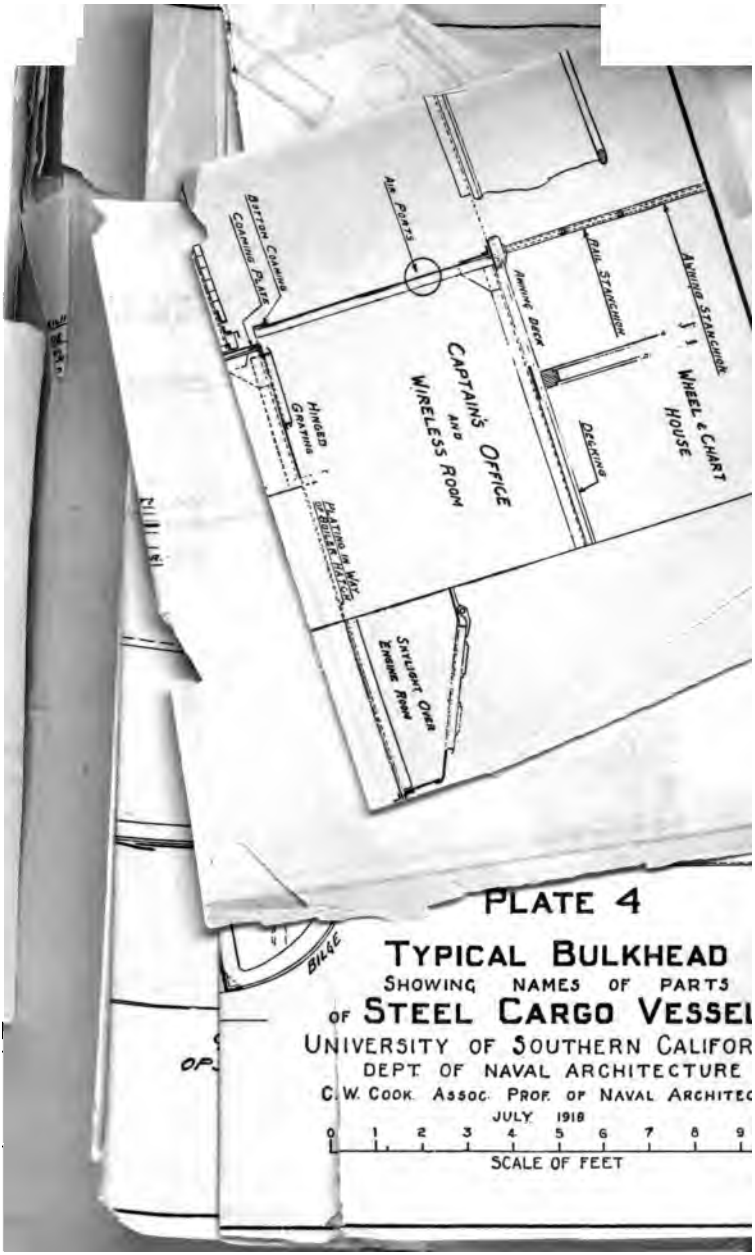
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Hinged Grating
Heating in Wet Compartments
Skylight Over Engine Room
Captain's Office and Wireless Room
Awning Deck
Rail Stanchion
Awning Stanchion
Wheel & Chart House
Decking
Bilge
PLATE 4
TYPICAL BULKHEAD
SHOWING NAMES OF PARTS
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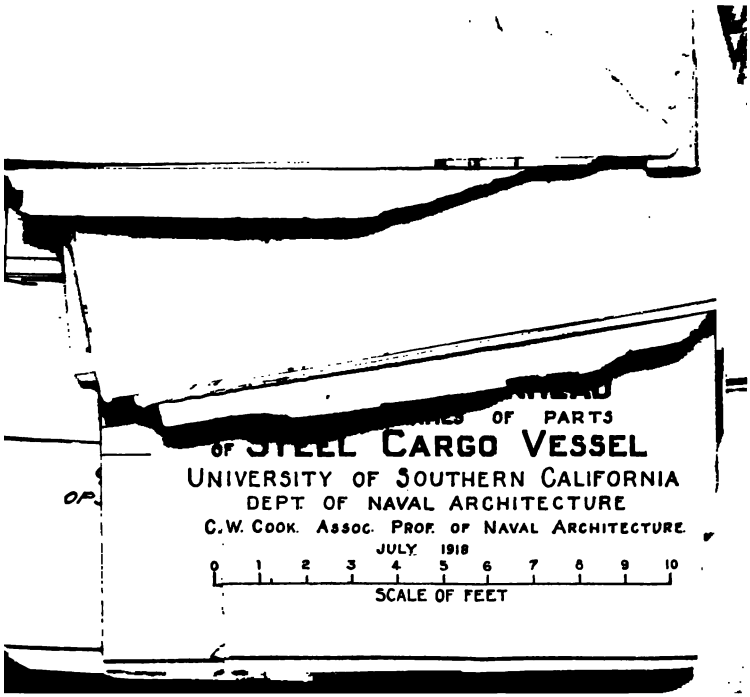
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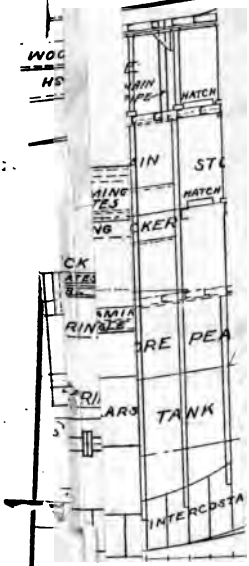
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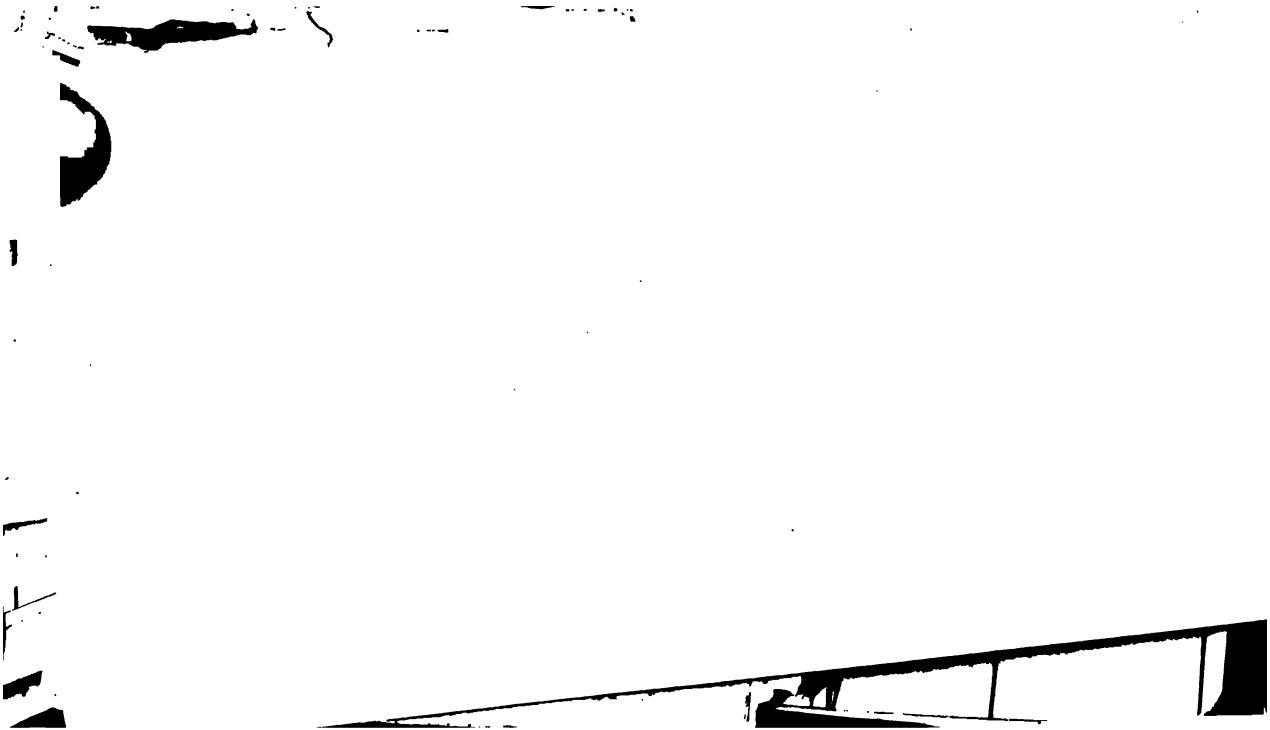

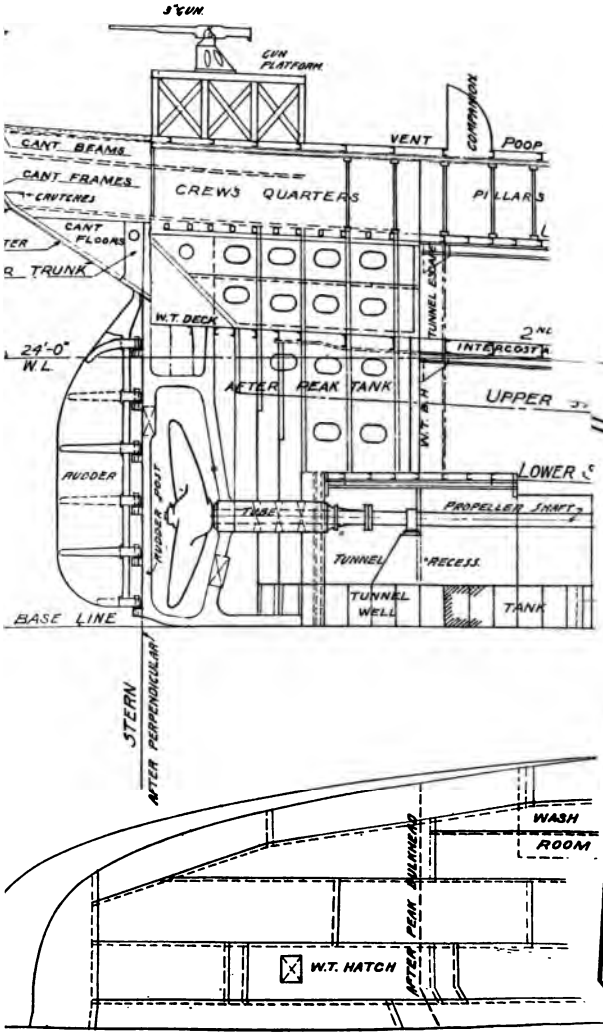
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CANT FRAMES
CANTERES
CANT FLOORS
TRUNK
VENT
COMPANION
POOP
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PILLARS
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2ND
INTERCOSTAL
24'-0" W.L.
AFTER PEAK TANK
W.T. B.H.
UPPER
LOWER
RUDDER
RUDDER POST
TUBE
PROPELLER SHAFT
TUNNEL
RECESS
TUNNEL WELL
TANK
BASE LINE
STERN
AFTER PERPENDICULAR
WASH ROOM
AFTER PEAK BULKHEAD
W.T. HATCH

PLATE 3

E, PROPELLER & RUDDER.

NAMES OF PARTS

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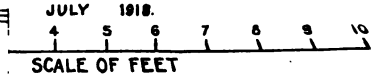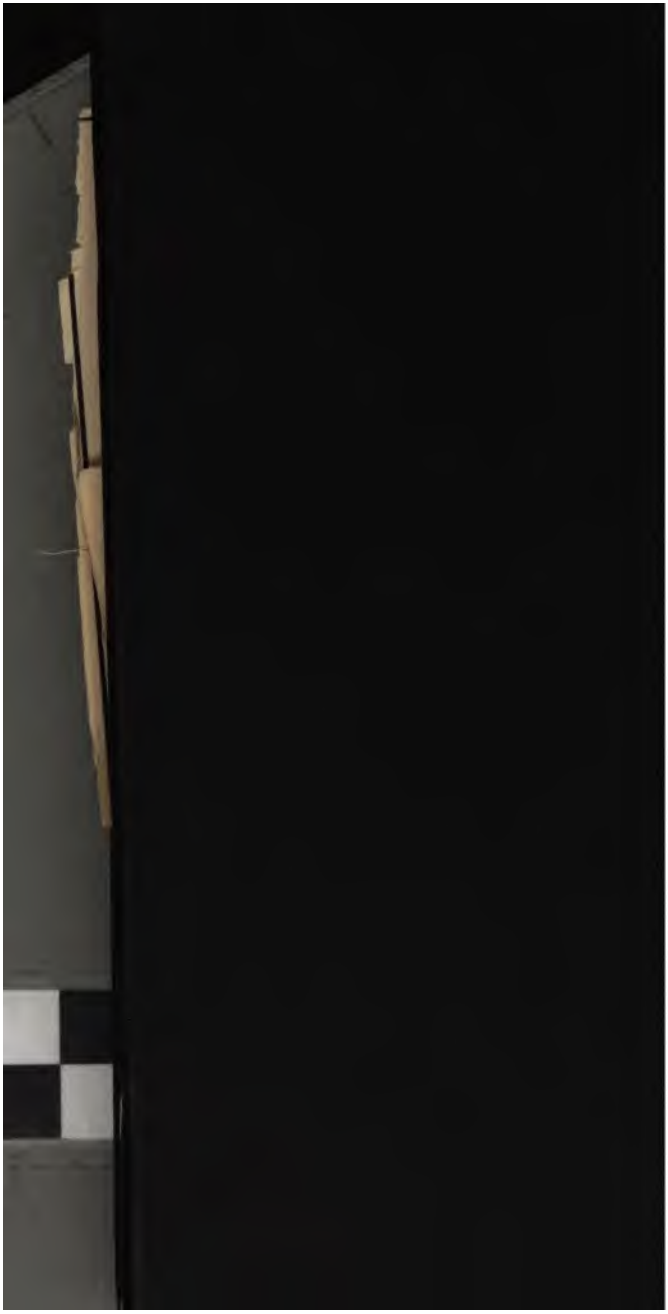
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